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INSTINCT AND INTUITION

A STUDY IN MENTAL DUALITY

BY

GEORGE BINNEY DIBBLEE, M.A.

FORMERLY SCHOLAR OF BALLIOL COLLEGE, FELLOW OF ALL SOULS COLLEGE, AND LECTURER OF ORIEL COLLEGE, OXFORD. AUTHOR OF 'THE LAWS OF SUPPLY AND DEMAND', 'THE PSYCHOLOGICAL THEORY OF VALUE', ETC. ETC.

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To my very good Friend,
Fellow-Worker and Helper over many difficult Stiles,
ARTHUR HUNGERFORD POLLEN

May, 1929. G. B. D.

DUALITY AND SELF-CRITICISM

'My little soul, vague, vague and soft,
My friend and like a stranger oft,
    Whither away?
Stark, bled, your little languors left,
Of all your shafts and shifts bereft,
    You are not gay!'

(*After some lines:*
  'Animula, vagula, blandula, etc.,'
    attributed to the
      Emperor Hadrian)

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PREFACE

PROFESSOR HÖFFDING in the Introduction to his *History of Modern Philosophers* draws a comforting reflection from his wide experience of great thinkers and their work. He attaches more importance to the right method of raising a new problem in philosophy than to the solution. The apparent or temporary solution may perish, while the problem lives on. A similarly indulgent judgment may be quoted from a fragment of autobiography by Professor Wildon Carr: 'The ideal of philosophy, as I aspire to it, is to find the right way of asking questions.'

To the problem offered by the evidences of mental duality in man, which is raised in this book, I have offered some kind of solution. The statement of the problem and the suggestion of a solution are necessarily full of gaps, sometimes on the mental and sometimes on the bodily side, as will presently appear. My first duty is to explain in what way the problem presented itself to me and how I come to be responsible for attempting a bold inroad into an unfamiliar subject.

An enquiry into the nature of Instinct and inferentially into an analogous mental phenomenon entangled with it, Intuition, was urged on me from my having come to a full stop in my researches into fundamental questions in the basis of another subject, Economics. Economic life is governed by the Laws of Supply and Demand and particularly by Demand. Such was my first conclusion from an early study.

Further enquiry convinced me that Demand wholly depended on Value, a subject which was mainly psychological but reaching out into the domain of philosophy. Finally, I came to the conclusion that, while Value concerned itself with the quality of the material goods valued and the conditions of their Supply, on the human or Demand side it was determined to a very small extent by intellectual judgments and to an enormous degree of overriding preference by plain human unreasoning instinct.

The main streams of economic enquiry narrowed themselves for me like the threads of a mountain torrent plunging together into the unknown depths of a subterranean channel. The simile is justified by my growing conviction that instinct was to a large extent formed, if not created, in stages that we are accustomed to call subconscious. In this its extra-conscious evolution it was accompanied by the same perplexing and even mysterious characteristics appearing unmistakably in intuition. The two are like brother and sister or perhaps twins of different quality.

In beginning this, for me, new investigation my indebtedness and gratitude are predominantly engaged on the mental side to a group of Cambridge philosophical writers, of whom the most prominent are Professor G. E. Moore, Mr. Bertrand Russell and Dr. Broad, but chiefly to the latter for his incomparable analysis of the relations between mind and body and his far-reaching determination of the limits within which one may be permitted to rely, as I must firmly do, on the doctrine of 'interaction', without which it would have been impossible to make a start.

Certain physiological discoveries about the brain have recently been made, also by Cambridge investigators, to whom I hope that sufficient justice has been done in the text, which afford us an insight into mental processes, only on the condition that we can argue from body to executive capacity in brain as well as from mind to behaviour. The doctrine of Interaction has to be provisionally established in order to enable us to carry on the study of the reciprocal relations of mental and bodily processes on a common-sense level.

Dating back to the great name of Descartes I must acknowledge my immense obligations to many philosophers of the French school, of whom I can only mention the most modern: MM. Henri Bergson, Maurice Blondel and my friend M. Jacques Chevalier, the able commentator and biographer of Pascal, all professors in their time, with many others referred to in the text.

I also wish to acknowledge most gratefully the novel light let into the dark corners of human nature by the quite different but all original and stimulating medical authors, Drs. Adler, Freud and Jung.

Finally I cannot possibly acquit myself adequately in words either here or later on for all I have gained and learnt from the great work of Sir Henry Head, Sir John Parsons and the late Dr. Rivers.

After my MS. was to all intents and purposes complete, I had the benefit of some invaluable criticisms on physiological points, where I had fallen into error, from a writer of great distinction in the scientific world. It is very possible that I have not used his advice and suggestions efficiently, but I am none the less extremely grateful to him.

G. B. DIBBLEE

BRUSSELS, *May*, 1929.

PART I

INSTINCT AND INTUITION ANALYSED AND EXAMINED

CHAPTER I

THE TERMS INSTINCT AND INTUITION CONSIDERED

It would not be easy to find a pair of terms, very frequently linked together, to which so much value and serious consequence are attached as Instinct and Intuition. They are important singly, and they are held to have important relations together. Like Value itself, to which, as I shall attempt to show, they are not remotely related, each has come to be widely and significantly used in a variety of meanings. Their common bond and their common mystery, perhaps, help to present a certain attractive and elusive interest which maintains their frequent use in popular speech in spite of the difficulty in defining them either together or separately.

With instinct there is a human side and an animal side. It might be supposed that the former would naturally excite the greater human interest. Curiously enough of late years there has been much more attention paid to animal than to human instinct. There is noticeable a certain definite tendency to exaggerate all the resemblances between them and to make light of all the differences. Since to my mind this has been overdone, I wish in the present work, for very good reasons which will appear later, to emphasize the purely human side of instinct and to point out the definite danger of drawing too easily analogies with ourselves from the study of animal traits and capacities. In fact it is not difficult to prove that the fundamental diversities are more significant than the superficial appearances of identity in the reactions and habits of the two classes of living creatures. In this respect the element of mystery must be eliminated.

Intuition is a purely human study. No one would, however, deny that it has for all that a mysterious charm among the unknown relations of the borderland of extra-conscious experiences, but the interest lies unmistakably on the higher instead of on the lower side of our human nature. We are thereby connected with the remoter problems of truth which, for want of a better name, have to be called self-evident.

Instinct suggests rather ominously some kind of inescapable bond with beings lower than ourselves. Intuition offers a brilliant hope and even a confidential promise and plausible expectation of a relationship with something demonstrably higher. It is my present aim to dwell chiefly on the more personal aspects of both instinct and intuition, what we may call their inward sides and relations, their mysterious similarities and connections with one another and their common foundations, deeply rooted in our misunderstood and far from fully conscious mental states and psychical conditions.

The validity of these affinities and bonds must be severely tested, and the basic problem solved, as to whether instinct and intuition have or have not a common identity. They are both too important for us to permit any uncertainty of the kind to remain. So far-reaching are their power and the extent of their influence, that between them they affect the whole and more than the whole of the realm of our consciousness. Linked as they are together with reason, they spread their influence over all human mental events and connect us with endless series of unknown relations below us, and who shall say with how high a range of all that is above us.

The first question which faces a serious enquirer in the subject is as to whether the terms themselves, instinct and intuition, represent real facts or groups of facts. Is it not possible that after all some of the apparent complications and confusions that surround them are due to misunderstanding or to flagrant misuse of simple and noble expressions for flimsy and rhetorical purposes? There are times when a contention of this kind seems more than plausible and almost true.

No; that is hardly the case. Whether the two words are either carefully defined in print or carelessly used in discussion, it is equally true of both that they are not mere fancy terms nor picturesque figures of speech. There remains behind the term, instinct, one consistent idea of importance which has a solid foundation. By intuition there is meant one single form of mental operation, which may deal with trivial and even fanciful details of perception and is equally able to grasp the highest flights of effort of which the mind is capable. Misused as both words may often be, they are seriously aimed at expressing real things.

The subjects covered by the two terms are not simple in themselves. If the words, instinct and intuition, faithfully represent two comprehensive mental facts of great importance, at least it must be admitted that each term has to do double duty in covering early as well as late or developed stages of the same subject. Simple instinct of animals is and must be very different from the instinct, governed by reflection, of educated man. So too the acute and expert insight into the details of a practical problem, to which the word, intuition, is frequently applied, is considerably removed from the intimate form of philosophic reflection, which carries us sometimes even beyond reason.

As we pursue our enquiry further, we shall probably find that, when what one social thinker or philosopher may call instinct comes to resemble closely what another or even the same theorist may call intuition, it will be because the reality in each case has a form which closely resembles a real form embraced by the other, or, more rarely, because one reality may be operating jointly in the field already occupied by the other. Both the real existence of instinct and intuition and their separate identity are facts which are by no means easy to determine.

To put it shortly in a definite form, it will be necessary to anticipate by a little the course of our subsequent enquiry. Before we can firmly establish the separate identity of instinct and intuition, we shall have to wade through many complications, of which it is possible now to indicate only that special relationship which offers the most serious difficulty. Among instincts the first and weightiest of which man is aware in consciousness is to use his reason, and somewhat later he will be inclined to rely upon his intuition. Again later still, it will be found equally true that man is wont to use his reason to supplement and criticize his intuition, and rightly or wrongly he may turn again from the dictates of reason to appeal to his power of reflective intuition.

By a quite separate instinct he may turn a deaf ear to reason and intuition, and act in some ill-considered but immediately efficient fashion. Alternatively the same process may take place in a more sudden and unexpected manner, when an individual, before his reason has time to work or his intuition to produce intelligible results, may have been moved to summary action more promptly still by unconscious instinct.

Here are three important faculties the relations of which we shall have to disentangle. In the seeming play upon words there is no verbal game or paradox nor real confusion, but a plain problem of stating in their right order complicated mental facts of the greatest importance, which can only be straightened out after our conscious and unconscious processes have been studied and our definitions determined.

The etymological origin of both words is not dissimilar. They are derived from the Latin and prevail unchanged in many languages. The Germans have not been able to improve on 'Instinkt', but they substituted 'Anschauung' for the substantive, intuition, with some graduated change of meaning, falling back on 'intuitives Erkennen' [1] for one important variation of the term. In French, where the idea and the word play a great part in philosophy, one verbal improvement has been effected by the differentiation of two kinds of intuition, to which reference will be made later, 'intuition immédiate' restricted to a primary perception of self-evident truth, and 'intuition réfléchie', denoting a re-emergence of intuition as a governing mental factor after its results or conclusions have been studied and modified by intellectual criticism.

In common use there are similar words of allied derivative and cognate meaning: Inspection, Introspection and Insight greatly resemble intuition and a form of insight is almost universally confused in popular use with a special meaning of intuition. Two other words, Intellect and Intelligence, have affinity, the first especially with intuition and the second sometimes with instinct. Yet no one would say that in many passages the first could not be interchanged with the second with great facility.

Taking together the four words, inspection, introspection, insight and intuition, which all signify an examination or interior viewing of states of the self, they tend to be differentiated as follows: inspection is philosophically restricted to examination of ordinary states of sensation or feeling, such as images, noises or pains, which are or may be only doubtfully states of mind, whereas, says Dr. Broad,[2] introspection should be used rather of the mental clearing up, as objective facts, of perceptual and memory situations. Insight may perhaps best be described as an intellectualized quality of highly efficient active mental perception, capable of viewing and discovering obscure relations between facts outside ourselves. It resembles very closely one of the definitions given by M. Henri Poincaré of intuition: 'La faculté qui nous apprend à voir, c'est l'intuition.' [3]

---

[1] Meyer's *Lexikon*.

[2] C. D. Broad, *Mind and its Place in Nature*, p. 315.

[3] Henri Poincaré, *Science et Méthode*, p. 137.

Intellect is a faculty sharply distinguished by some from intuition. 'Intuition', says Professor Carr, 'is the apprehension by the mind of reality directly as it is and not under the form of a perception or conception, all of which by contrast are intellectual apprehension.'[1] Neither is intellect allowed to have any affinity with instinct. The French philosopher, Professor Bergson, for instance, throughout his doctrines places instinct in the most absolute opposition to intellect. Intellect seems to be the one term in this group which has to stand by itself.

The more general term, intelligence, in so far as it is not limited to the operation of reason or intellect, is interpreted as having close relations with instinct, especially in its human forms. Instinct is a privileged form of intelligence, not exposing its processes, but handing its ready-made results to the practical, efficient, willing and motor self for use in competition with the more formal and pretentious dictates of the slower-moving intellect.

Let us examine representative examples of the use of some of these terms together, in contrast and in comparison with each other. In literature instinct plays a greater part than intuition. The poet, M. Maeterlinck, abandons the case of instinct as compared with intelligence in rhetorical despair: 'En tout cas l'hypothèse de l'instinct n'est pas plus satisfaisante que celle de l'intelligence. Peut-être l'est-elle un peu moins, car nous ne savons pas du tout ce que c'est que l'instinct, au lieu que nous croyons, à tort ou à raison, ne pas entièrement ignorer ce que c'est que l'intelligence.' Here it becomes apparent that the problem is so stated as to suggest ultimately a more ambitious solution: 'Ne pourrait-on provisoirement rattacher l'instinct des insectes, et particulièrement des fourmis, des abeilles et des termites à l'âme collective.'[2]

A more popular tone appears in an address given by Sir Oliver Lodge, almost as a reformed man of science, in a Congregational Church at Oxford in October, 1927.[3] Humanity, he said, seemed to have a sort of instinct for things of the spirit, which were not accessible to our systematic methods of scientific exploration. Science was a body of organized knowledge and was apt to despise instincts or to suspect the intuitive apprehension of truth not founded upon ascertained and formulated data. . . . Instinctive faculties were not to be despised, because we did not understand them. It was clear that the lower animals were guided by instinct, and it would be a great mistake to close this avenue to truth on the part of humanity merely because gradually and in certain departments definite knowledge had replaced instincts.

---

[1] H. Wildon Carr, *Philosophy of Change*, p. 21.

[2] *Les Termites*, p. 204.

[3] From a report in the *Manchester Guardian*.

Lord Irwin again, I remember, wrote in 1925, when he was Mr. Edward Wood, some careful articles in *The Times* on the value of instinct in political and social life, dwelling particularly on reverence as a quality neither intellectual nor affective, which drew its power from roots in some source deeper than either.

The philosophers are equally respectful to both instinct and intuition, although the weight of emphasis begins here to fall rather on the latter. Professor Blondel of Aix has written in his great work, *L'Action*: 'Dans toute œuvre humaine il y a donc un mysticisme naissant' . . . 'dans l'œuvre sensible, dans le phénomène, l'art insère fictivement le réel, le vivant, l'humain, le divin; il enveloppe d'instinct et découvre par intuition l'équivalent symbolique de toutes les aspirations encore implicites du vouloir.' [1]

Professor Bergson has become, as we shall see later, almost the prophet of intuition, but I quote him here less for the tendency of his doctrine than for his use of words. He does not hesitate to link the two terms emphatically together: 'l'intuition, je veux dire l'instinct devenu désintéressé, conscient de lui-même, capable de réfléchir sur son objet et de l'élargir indéfiniment.' [2] Again in his letter to Dr. Höffding [3] on the usage of terms he discusses specifically his theory relating to intelligence, instinct and intuition. The first, he remarks, can know unorganized matter absolutely, if incompletely; the second is made to be useful in life, to know it from within, even if incompletely and barely consciously; while the third, he writes, 'prolonge, développe et transpose en réflexion ce qui reste d'instinct chez l'homme. Elle est capable d'embrasser la vie de plus en plus complètement.'

Scientific men take a different attitude. They have mostly tended to be far from patient about intuition, while bestowing a vast amount of attention on all kinds of instinct. Dr. Broad, who might have been expected to take a position half-way between science and philosophy, sides in this matter decidedly with the former. He brushes aside all doctrines which presume 'to contrast the merely mechanical processes of the intellect with a mysterious and superior faculty of intuition, which is apparently supposed to be manifested in its purest form in the instinctive behaviour of animals.'[1] In his very able work devoted to all the operations of mind there appears to be no other mention of intuition, except a brief reference to 'intuitive referential cognition'.

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[1] *L'Action*, p. 229.

[2] *Evolution Créatrice*, p. 192.

[3] Quoted in Höffding, *Modern Philosophers*, p. 161.

Among scientific men the doctors, psychologists and physiologists are not all unanimous in their attitude on this subject. Very few on the whole have any regard for intuition, as being metaphysical in its nature; practically only the special students of the unconscious seem to take it seriously. Mr. J. H. Van der Hoop (*Character and the Unconscious*),[2] for instance, defines intuition as the spontaneous expression of the instincts and of that part of the unconscious psychical life which is most clearly related to them. Dr. Jung is more emphatic in taking intuition seriously. In his *Psychological Types* he seems to place instinct in the background, so far as human beings are concerned, while he grants to intuition the privilege of being, with feeling, sensation and thought, one of the four basic psychological functions. It is to be considered, in his opinion, neither as sensation, feeling nor intellectual conclusion, though it may appear in any of those forms. It is a kind of instinctive apprehension irrespective of the nature of its contents. Professor Driesch (*Crisis in Psychology*)[3] holds much the same views, although he neglects the term, intuition, preferring to transfer many of the familiar characteristics of intuition to his pet faculty of 'entelechy', or unconscious purposive urgency, which he classes with instinct. At the bottom of instinct, he concludes there must be some particular form of knowledge.

For the most part the interest of scientific men turns naturally to the intricacies of instinct and its particular relation with emotion, rather than to any analogy it may have with intuition. It is in this direction that Dr. McCurdy guides his researches. 'So frequently', he writes, 'do instincts and emotions appear together that both the layman and the psychologist are apt to label behaviour with either of them indifferently. They are not invariably associated. Nor are emotional expressions necessarily associated with instinct or emotion.' On the other hand, he writes later that, 'if the organism responds to a stimulus immediately and adequately with instinctive behaviour, no emotion whatever is engendered.'[4] The relation of instinct to emotion is thus shown to be more apparent than real.

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[1] Broad, *Mind and its Place*, pp. 334 and 636.

[2] P. 153.

[3] *Crisis in Psychology*, p. 187—also pp. 13 and 137.

[4] *Psychology of Emotion*, pp. 37, 87.

While in the view of psychologists instinct and instinctive behaviour seem to shade off into the purely human feature of emotion on the side of consciousness, on the other the peculiar mystery and the unconscious elements of instinct seem to drag it down into close relationship or at least very close analogy with all the forms of animal intelligence. The comparative or relative study of human-animal instincts has been ably and patiently followed by many writers with disappointing results. Some of the consequential deductions seem to me of doubtful value, which may be due to inherent difficulties or perhaps to an over-confident method.

In following up investigations along the line of comparison with animals a new set of difficulties will arise about instinct. Animals and men cannot communicate their inner sensations and experiences to one another. Men can observe the behaviour of animals and infer some kind of mental condition as a result, but with no expectation of certainty. Since there can be no introspection, the relationship of body and behaviour to mind must remain a matter of inference. We have therefore only two courses of investigation open to us. We can contrast the observed behaviour of animals with that of our own young, and we can compare the anatomical structure of successive grades of animals and use the information for interpreting the functions of the rather different structure of human organs.

In both these directions lie the researches of Sir John Parsons, who relies equally on the observations of animal behaviour by Professor Lloyd Morgan and on the anatomical investigations of Sir Charles Sherrington, Golz, Schrader and Kappers, besides his own studies. Sir John's main and perhaps sole preoccupation in this connection is with instinct. Intuition is not even mentioned. He discusses the common limits of emotion and instinct on the side of mentality, and he studies the sources of instinct in the biological development and comparative anatomical structure of men and animals. Perhaps he hardly lays sufficient stress on the difficulties involved in co-ordinating both sides of an argument of this character, on the inherent delicacy of all inferences drawn from mind to body as well as of those drawn from body to mind.

On the mental side he raises a new difficulty of distinction quite apart from the resemblances already indicated between instinct and emotion; because, attacking the subject of human instinct chiefly from the point of view of its resemblances with animal characteristics, he regards it as impossible to draw the line in behaviour between compound reflexes and instinctive reactions.

Sir John Parsons opens up a fascinating and very nearly new field of speculation, when he tackles the physical side of instinct, of which side I shall have much more to say later. On the question of structure he rules out, in the case of animals and presumably also in the case of man, all connections between instinct and the operation of the cerebral or higher centres of the brain. He definitely localizes instinctive activities not in the cortex or upper brain, but in the less known features of the mid-brain and optic thalamus: 'the optic thalamus is the supreme centre for . . . instinctive reactions.'[1]

Now if the course of present research were to prove, as some physiologists have rashly prophesied, that the thalamus was a perishing organ, we might see one way out of the problem of our unstable mental unity. If the human race were gradually to drop its lower brains, or basal ganglia, as they are often called, it might discard its lower instincts for the benefit of its higher intellectual faculties. But comparative anatomy, as Sir John Parsons explains, shows nothing of the kind. While the brain is growing in size and efficiency and still remaining a homogeneous unit, we have the thalamus increasing its equipment and differentiating its constitution at the same time.[2] The old thalamus adds to itself the neo-thalamus and other new parts and goes on complicating itself in quite a Bergsonian way. Phylogenetically, that is to say in the history of the development of organs in progressive evolution, the basal ganglia of the brain are quite possibly gaining and not losing ground in their race for survival with the cerebral hemispheres. So if we are to argue from structure—I do not wish to press the point unduly—we seem to have developed the power and capacities of human reason and intuition without losing the variety and complexity of the instinctive activities at human command.

Are we then to suppose that the evidence from the physiological side of our cerebral organization will constitute the chief interest of the whole subject of instinct and intuition in future? Certainly not: the evidence from structure may and will prove to be important; but the investigation must always remain a two-sided problem. The inferences from anatomy will prove to be intriguing enough to open up a field for very wide psychological speculations and we shall be compelled to ask whether there are sufficient facts in the mental history of instinct and intuition to correspond to all the new suggestions which are thus offered. In my opinion there is also a large amount of similar evidence to be obtained on the vexed question of mental duality from the subjective side.[1]

---

[1] *An Introduction to the Theory of Perception*, p. 94.

[2] A purist in evolutionary development, in comparing the youth and uniformity of the cerebral hemispheres with the age and heterogeneity of the dissimilar organs of the thalamic region, might conclude that the modern brain, as we understand it, was no more than the most important and most complicated ganglion put forth by the medial nucleus of the optic thalamus.

Yet a further perplexity presents itself, which is more one of names and descriptions than of essence. Are there many varieties of instinct and more than one of intuition? Besides the distinction between simple intuition and intuition developed by reflection, which the French have so well expressed in their philosophical nomenclature, the question of internal classification arises also very acutely with regard to instinct. Are we to talk of instinct, or of instincts, or of instinctive behaviour? If the latter term is in order, does it refer to the conduct and activities of a personified 'Instinct', or to a common characteristic of all the separate 'instincts', or does it mean something a little different from either? Lastly, is there in effect a real single faculty of instinct, to balance the faculties of reason and intuition?

Substantially, I say, it implies all of these things together and that some real meaning attaches itself with perhaps unequal accuracy to each separate form of expression. The subject of instinct is so wide that it can find room for all these variations and possibly for many more. Its content will be far from exhausted in the few chapters which are here devoted to it.

We cannot altogether escape a broad-spreading danger here of a confusion and reduplication of meanings that is either ludicrous or lamentable in the mere matter of language. These two terms have come to be bandied about so carelessly that they have sometimes become nothing but familiar tokens, good coin perhaps originally, but now debased and clipped and worn out beyond recognition. The problem of extrication is a real one that cannot be put lightly aside, because there do not exist two similar terms of equal importance with instinct and intuition in international currency and of acknowledged universal value.[2]

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[1] The treatment of mental duality by introspection will be undertaken in Part II, Chapters XI–XVI.

[2] The term, Value, itself is their only rival.

Admitting their value, perhaps also their need for rectification and for a full explanation of their content, it is not easy to begin to assort their several meanings to each. In the first place search must be made for any counterfeits among the legitimate coin and secondly for any indication of overlapping in validity and sphere of usefulness. It is probable that, though much carelessness and a little pretentiousness appear in their use, there is generally a true ring in the weighty sense attached to them. They are usually to be found in a serious and often in a transcendental context.

The meanings of instinct and intuition, when used as technical terms by serious writers, often overlap, but that is because the broad facts they represent do in fact frequently cover the same ground. It is, for instance, sufficiently correct to say, as noticed above, that it is one of the earliest of human instincts to profit by the teachings of human intuition as well as by the power of thought. In the great traditional literature allowances must also be made for changes in teaching and habit, for differences of language, and above all for the natural antithesis between philosophical and scientific methods of reflection and expression.

Going back a little over the questions and problems which have been already opened up, the clearest answer to our enquiry will ultimately arrive in determining what instinct and intuition really are in themselves. This will reasonably come later. The momentary task lies in unravelling the doubt as to whether the words are loose conversational expressions and rhetorical terms of emotion or whether their philosophical, scientific and common use is a genuine phenomenon representing mental facts of importance. We have assumed already, subject to proof later, that both instinct and intuition are real things under puzzling disguises.

We may find in examining their serious use that self-contradiction is sometimes involved, either through carelessness, through mere eloquent ostentation, or through the different orientation of the points of view taken up by scientific men and philosophers. Here we touch a more difficult point than any mentioned above and one to which I believe there is no satisfactory answer. It is questionable whether even the technical uses of the terms instinct and intuition by trained writers always cover the same set of facts in each case. It is possible on the other hand that the more popular use of instinct and intuition by its very vagueness comes closer to the involved mental facts concerned.

The oldest and most consistent use of the term intuition has been in philosophy, where it has played a noble and supreme part. It appears first with the *cognitio intuitiva* of the schoolmen, and began to be crystallized about the time of Descartes, who, after his celebrated dream, placed it on a pinnacle in Cartesian theory. It was the notable example of Descartes, which consecrated intuition as the peculiar fountain of truth, as the following passage from his most recent biographer will show: 'Ainsi la vérité nous est connue par une espèce d'instinct naturel, qui "est en nous en tant qu'hommes et est purement intellectuel", à la différence de l'instinct qui "est en nous en tant qu'animaux"; et cet instinct intellectuel, "c'est la lumière naturelle ou *intuitus mentis*, auquel je tiens qu'on doit se fier", alors que l'autre "ne doit pas toujours être suivi".'[1]

For nearly two centuries in one way or another the doctrine of intuition as the ultimate source of self-evident truth held sway. It served as the foundation of the English-Scotch school of Reid and Hamilton, which came to be labelled as 'Intuitionism'. During the same period little was heard of instinct, except as a figurative expression. The latter term and the ideas behind it are now beginning to come into their own.

Pascal was a forerunner of the moderns in this as in other respects. He made no account of intuition, but he gave prominence to instinct, and even distinguished between two kinds of instinct, not however with any great precision, as we shall see later on.[2] In the school of modern scientific research instinct is as preponderant as intuition was formerly. Investigations into animal instinct have been brought into analogy with the human faculty, and the distinction begins to be important between the separate instincts which cause dogs to chase cats or cats to lick their forepaws, and such larger generalizations as the instinct of self-preservation common to beasts and men.

Both these kinds of cases would be covered by the general description of instinctive behaviour, which would not particularize the source or origin of the impulses coming from unconscious motives. The same wide non-committal expression would be suitably applied to the group-actions of people in a crowd or mass, where behaviour, for which particular reasons cannot be assigned, is attributed rather to instinct than to the combined propulsion of individual wills. There is a growing body of opinion which holds that collective emotion and activity are to a large extent unconscious in their origin.

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[1] J. Chevalier, *Vie de Descartes*, p. 171, quoting from *Adam and Tannery*, II, 597–9.

[2] See Chapter IV.

Beside the vaguely sketched schools of learned opinion, some over-emphasizing one view and some accentuating the other, there is the common literary, social and political use of both terms, borrowing from both philosophical and scientific sources in the facile way with which we are sufficiently familiar. It is on this neutral rather than common ground that we become accustomed to hear of the term instinct linked with that of intuition, each contributing by its unknown qualities something to the atmosphere of mystery present whenever the true motives of action or mental states are hidden or unexplained.

Between the philosophic and scientific uses of the terms instinct and intuition, there is something of a gulf, which the literary, rhetorical and everyday use cannot entirely fill. The points of view are too far apart. The cleavage goes very deep into primary problems.

The philosophic view is concerned predominantly with mental phenomena, affording room for great variety of opinion. This involves the study of mind as opposed to that of the body.

The scientific view, perhaps I ought to say the physiological view, presents two series of remarkable phenomena, one dealing with behaviour and the other recording variety in structure, which both concern the activity and organization of the body as opposed to that of the mind.

The valuable work thus made available on each side of this logical gulf is not easy to carry across, so as to make the inferences drawn from only one side valid for the benefit of both. For that reason some accepted form of the theory of interaction of mind on body and of body on mind is a necessary basis for all discussion. Even on these lines it remains probable, however strongly the case for the identity on both sides is made out, that most people will conclude that instinct is more a question of the body and that intuition remains more a problem for the study of mind.

The theory of interaction, by which I take my stand in the course of the present investigation, is a bridge that makes a valid connection both ways, provided that a foothold can be found on each side on which to base the end of the bridge. In the supremely difficult task of mental study suitable corresponding parts of the problem are hard to find in exactly opposite positions.

The enigmatic relations between instinct and intuition present a valuable case in point. About instinct it will be found that we know a great deal from the body to mind side of the argument. We know about the habits of animals and we know something about our own instinctive behaviour from observation. We can also build up strong inferences from bodily structure in animals and men. But we know next to nothing about the mental side of instinct. It is mixed up both with unconscious reflex and with conscious emotion. We do not yet really know whether it is constituted of thought or of feeling or of both.

On the intuitive question the arguments lie the other way. We know a little about intuition from introspection and that little creates a presumption that it is a mental fact of great importance. But we know nothing about its physical side in ourselves, nor for certainty where it takes place. Nor do we see any characteristic behaviour in animals which will justify us in supposing that intuition or even reason can either of them be agents in their poorly-equipped minds. Consequently the instinctive bridge has little or no hold on the mental side of the argument and reciprocally the mental facts about intuition can find no hold at all on the physical side of the argument.

The conspicuous lack of reciprocal logical correspondence at each point, where the preponderant weight of evidence on the other side is the stronger, amounts to a breach between the two sides. It constitutes a solid reason, psychological in character, which will stand in the way of identifying instinct wholly with intuition. There is nothing on the mental side to balance the strong physiological evidence for instinct, while the weighty mental evidence for intuition finds no bodily counterpart on the other.

Like as they are, no one, except figuratively, can call them enemies. Friends they more probably ought to be, owing to some common features in their natures, but the name of either is never quite applicable to the other. Any reconciliation of their diversities, otherwise than formal, is substantially impossible.

Given some valid theoretical basis of interaction, it will probably be feasible to show two main facts about the relations of instinct and intuition. In the first place they will be found to be not identical, chiefly on account of the strong physical relations of instinct as contrasted with the wholly mental relations of which we are aware in intuition. Yet the close investigation which will be made in Chapter VIII, wherein instinct and intuition will be formally compared after they have been separately examined, will show that to set them apart as merely a bodily phenomenon on one side and a mental phenomenon on the other is too easy a solution. In the second place the true reconciliation of instinct and intuition will only appear as a feature of the unity of the self in mind, will and action.

Public opinion is not far out in attributing so much power and such riches of character to our faculties, our human faculties, of instinct and intuition. They are indeed very much like what they are commonly supposed to be. The touch of mystery about each of them is not deceptive. Their emergence from unconscious sources gives them a real and not a factitious independence of our conscious powers. Common usage of both terms is possibly superior in its accuracy to the more artificial technical language of philosophy and science.

At the end of the more detailed and separate examination of instinct and intuition, which I propose to undertake, it will become easier to see why the resemblances between the two faculties are striking and persuasive, without carrying us over to believe that they are identical. The delicacy of the task in drawing any distinction between them in certain kinds of mental situations will be shown to arise, not because intuition is a form of instinct or vice versa, but rather owing to the much more important fact that the operations of both one and the other take place chiefly in extra-consciousness. The mysterious element in both is to be taken as a common feature and not as a bond of identity.

In comparing the two faculties there are greater confusions to be cleared up on the boundaries of instinct. We shall have to understand why the psychologist on one side cannot freely distinguish between instinct and emotion and why the physiologist and the physician on the other cannot draw a firm line between half-conscious instinct and wholly unconscious reflex action. Instinct is neither emotion nor reflex action. It differs from emotion in that its processes are largely unconscious, though it is aware of its conclusions and results. It differs from reflexes, because it has conscious results and is aware that it is producing them, while reflex action, in man at any rate, has no conscious accompaniment from first to last. The lines of division on both sides are so finely drawn as to be inappreciable. We are tempted to think of instinct as a greater compound or complex or miracle, if you will, within the bounds of which smaller processes are merged and petty complications play their lesser part without realizing that their own performances are contained in a comprehensive whole.

Similar perplexities relating to boundaries of function are offered for explanation with regard to intuition. Intuition often seems to shade off into mere clever guessing. That may be called the human side of intuition. The other side is so indefinite that it may be called mystical or divine. There is no limit that is not attainable from the heights of inspiration at the base to the summit of the marvels of ecstatic vision. Everything there is possible. The resources of language and the capacity of memory limit what can be retained and the little that can be communicated to others. The inward confidence and security that remain are indescribable on the testimony of those who have experienced the loftiest flights above reflection and thought.

CHAPTER II

INSTINCTIVE BEHAVIOUR

Instinctive behaviour is the most important general fact in life. It is not necessarily so in human life, which is capable of aiming higher. Even a large part of human life is organized to satisfy instinctive impulses, and instincts of various kinds supply not only the motive but the method of the greater part of human conduct. Interpreting life more widely, there is little of animal or human energy which is not either instinct, or in the way to become instinct, or something more or less remotely instinctive in its source. It is not straining words to say that both intellect and intuition, the rival faculties of instinct, are each often set in motion by instinctive desires and emotions. Their operation may be often also suspended at will by the same controlling influences.

There is a sense in which the word 'instinct' is used alone, as a kind of multiple noun, denoting an aggregate of conduct and motive, wherein many mental states are mingled. It is of weighty psychological importance and I will deal with it later.

There are also single generic items of incentive to conduct, called 'instincts', a sense which governs the strict physiological meaning of the word. The inborn association between a definite stimulation coming through one of the higher centres and a bodily activity may be essentially considered to be a unit of physiological instinct. These unit instincts are prevalent in the conduct of men and animals. In the latter they govern almost the whole field of activity. In the former they are possibly more numerous as units, but considerably less operative separately, owing to the prevalence of human reason as a guide to conduct. Human instincts of this minor kind have tended to become mechanisms playing a subordinate part. They will also be considered by themselves in a later chapter.

Instinctive behaviour in man is a complete and important subject by itself. It is perhaps mainly but not altogether a physiological subject; because the region of the brain where its activities are prompted if not carried on is highly differentiated and some localization of function has been attempted and accomplished. The close association of emotion with instinct has no doubt an explanation due to local contiguity of known impulses. The large part also played in instinctive behaviour by unit-instincts embodies the mechanical side of instinctive activities. Psychology has a share in it which is not negligible; because emotion beginning with instinct carries instinctive feeling over on to the mental side.

Instinctive behaviour is not specially concerned with but has to take account of economics and sociology, where collective instincts, group instincts and the mysterious sympathy which is the bond of all such spiritual combinations play a mighty but as yet a little understood part.

Instinctive behaviour may be said to sum up all the three aspects of instinct. Instinctive behaviour presents the material of the unit animal and human instincts; it is the composite form of the intelligent instinctive activity regarded as a general source of human energy; and it is the essential feature in all the crowd and mass movements which are a significant phenomenon of the prevailing unknown in human nature. Instinctive behaviour can be generally described as the most comprehensive convenient expression covering all the separate manifestations of instinct. It is equivalent to the sum of instinctive activities, whatever may be their origin.

Instinctive behaviour is not the same as instinct. The difference has to be emphasized because in many quarters no distinction is made between the two. Professor R. S. Woodworth of Columbia University, N.Y., writes that 'instinct is native behaviour'. 'It is contrasted with habit, knowledge or anything in the way of "learned" reactions.'[1] Here there is something of a confusion of thought on the surface, because behaviour is not on the same plane or level with a mental condition, like knowledge, although it is possible to compare it very well with habit, which is a form or mode of action. Instinct is essentially a form of semi-conscious, intelligent, autonomous mental operation, not far removed from a mental condition which prompts and guides a form of conduct. Because we know very little about it except in its practical results, as a form of conduct, is no reason why we should confuse it with conduct or consider it as nothing but a type of human or animal activity.

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[1] *Psychology*, p. 105.

Instinctive behaviour can very well be studied by means of contrast, as for instance in comparison with intelligent reasoned conduct, with habit, with emotional expression and with that group of complex activities of which reflexes are the best known.

Instinctive behaviour is intelligent conduct of a kind, but not of the kind of action founded on a conscious purpose. A typical pair of contrasted activities would be the building of a nest by birds and the settling in a home by a couple of human beings. In the first case instinct plays its part completely and the practical aim appears at the end of a series of adjusted actions, all of which are stereotyped according to inherited aptitudes. In the case of house-hunting or house-building a man and his consort would follow their instinctive tendencies after mating with much more elasticity of means, choosing between minor instincts, reasoning and experimenting to an extent which only a firmer consciousness of their ultimate purpose would justify.

Instinctive behaviour resembles habit to such an extent that it has often been too easily explained by Romanes and others as the result of individual intelligence crystallized by prolonged habit. If this solution could be accepted, many of our difficulties in interpreting the growth of instinct would vanish. Unfortunately there are two objections.

The first is the physiological principle now generally accepted, into which we shall enquire later, that acquired characteristics cannot be, or at least are not generally or easily, transmitted. A lucky discovery of a new method of procuring food or building a nest would not be stereotyped in physical structure and transmitted as instinct to ultimate offspring, even if persisted in for generations, any more than children are born knowing a language which their ancestors have used for centuries. Professor Lloyd Morgan, although he maintains the orthodox view, sympathizes with the shorter and easier explanation and accounts with great acumen for its prevalence: 'Instinctive activities so often take the line which is marked by adaptive habit, that it is not surprising to find many who believe that instinct is neither more nor less than inherited habit.'[1]

The other objection is psychological, but none the less real, and has been well expressed by the French philosopher, Ravaisson,[2] that it is habit which resembles instinct by creating laboriously and imperfectly by experience in a lifetime a second nature of partially automatic actions in series, which only a slight shock

[1] *Habit and Instinct*, p. 321.

[2] *L'Habitude*, pp. 31, 32, 42.

to the system or even old age and mere discontinuance are sometimes enough to wipe out. In other words, the natural succession is from instinct to habit and not, as is often supposed, from habit to instinct.

Habit, psychologically speaking, is the reverse of instinct. Only habit will conquer or modify deeply-seated instinct. A great deal of human education is devoted to replacing noxious instincts by sound habits. Habit, a second nature, transitory though it be, must be painfully engrafted on the first nature, as exhibited in instinctive behaviour.

The psychological argument against the inheritance of instinct from habit, though elusive to the careless eye, is far stronger than has been generally supposed. To begin with, proof is lacking that habit in animals preceded instinct. Since we know that habit has succeeded and often replaced instinct, to reverse the succession is only another instance of the familiar fault of reading human nature backwards into prehuman conditions. An article on *Habitude* in Ad. Franck's *Dictionnaire des Sciences Philosophiques* puts the issue briefly: 'Il est aussi impossible, quoiqu'on l'ait tenté bien des fois, surtout dans le dernier siècle, de résoudre l'instinct dans l'habitude que l'habitude dans l'instinct.'

Habit is in fact in animals and human beings the phylogenetic successor to instinct and for that reason superior in its specific purpose. Where instinctive behaviour tends to be intractable and rigid, habit can be modified with effort. The power of adaptation possessed by a plastic instrument like the human tongue for technical purposes, such as various languages, compares favourably with the resistance to modification of a less perfect instrument. A parrot's tongue is, for instance, half-way in its adaptability between the tongue of a cock and the tongue of a child.

Instinct is created far more firmly by the natural selection of self-fitted types in an infinite series of attempts by trial and error. It is the coincidence of three kinds of fitness which establishes instinct: the external network of circumstances in which alone the species can flourish and in which therefore it is fixed; the mediating corporal mechanism whereby the necessary routine is made so easy as to be the readiest solution of a particular difficulty; and the deep traces of some neural path conducting unconscious intelligence, which has often presented before in the history of the fixed species the same obvious and appropriate solution to the same regularly recurring problem. Both the appropriate organ or limb and the requisite neural track are fixed by the conditions of survival in the usual environment chosen by the species.[1]

In another direction instinctive behaviour has an almost equal resemblance to emotion as to habit. It fits emotion as the hand does the glove. But equally the hand is not made for the glove and the instinct is more important than the accompaniment. There are more kinds of instincts than there are kinds of emotions, even in the human race. Where instincts are most powerful, as in the insect world, emotions are absent. In the human race some light is thrown on the matter by consciousness. We are far less conscious of our instincts than of our emotions. We are aware of how to control the latter either by will or by some simple training, whereas our instincts are more recalcitrant or elusive. Like habit emotion is a phylogenetic successor to instinct. Both are probably developed out of instinct as useful substitute forms.

Dr. McCurdy, who has studied instinctive behaviour and emotion together, recognizes that mixed states are sufficiently frequent to make any hard-and-fast line very difficult to draw between them. Both laymen and psychologists, he writes,[2] can easily apply either name to certain specified forms of behaviour. Yet there is no real identity and it is even probable that emotion may constitute for certain mental states, where instinct is strong, a form of discharge or expression very nearly equivalent to that of action in certain cases.[3]

The group of phenomena called reflexes are still more difficult to disentangle from instinctive behaviour. We must begin by going behind reflexes to simpler forms of embedded intelligence, such as the inner correlations of automatic action, collected in our circulatory and visceral systems. These are not in us conscious, except in some form of disaster, but in their early historical attempts at functioning, in what physiologists would call their phylogenetic past, these processes had some critical accompaniment foreshadowing intelligence, which was probably all the consciousness possible for that kind of creature at that early date. Their functioning now is still adaptively intelligent, if not conscious. The tropisms of plants in seeking the light are intelligent, if not conscious. Our autonomic system has probably another low standard of intelligence, grading up to the kind of delegated intelligence which accompanies reflex action, and advancing further to the partial consciousness of instinct. This is not difficult to conceive, especially if, as some hold,[1] our memory has preceded our consciousness.

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[1] The difficult point of heredity of instinct is discussed at the end of the next chapter (III) and more especially under what I have called the 'triangular tie' in the beginning of the last chapter (XX).

[2] *Psychology of Emotion*, p. 38.

[3] Suppose, for instance, that I as a primitive man feel an instinctive prompting under injury from my enemy for immediate revenge. If I act, emotion is quite unnecessary. Alternatively, I may experience and exhibit the emotion of anger and thus become able to convince other men in my neighbourhood of the necessity of bringing him to justice. The object of instinct is action. The object of emotion is the communication of feeling, possibly leading to ultimate action.

Reflex actions, as a rule, are not part of our consciousness, although we can bring them into its range with an effort, if reminded of them by an interruption. Instinctive behaviour, however, in its operations is very largely present to us in consciousness. It is subject to a degree of more or less attention. Its guiding power, whatever form of intelligence that may be, is not quite frank about instinctive activity during its initiating process. We sometimes become aware of our instinctive behaviour only when it is ended. We know what our instincts often make us do or have made us do, but we have to think a great deal as to how it was done and we are often quite ignorant of how we came to do it.

Since we ought to place instinctive behaviour in some relation to reflex actions, as a whole, undoubtedly it must be declared superior to them. As Professor Carr-Saunders says: 'Instinct is more than compound reflex action, because it involves the organism as a whole and is accompanied by, or is the outcome of, a mental process.'[2]

Physiologically speaking, an instinctive activity may be narrowly defined as a highly complex group of compound reflexes. It has the same afferent, central and efferent neural machinery, but it is a little bit more expensively constructed. The central link, for instance, of the instinct of sucking at the breast does not lie in the lips, nor the nose, nor the eye, but somewhere in a higher command. Hence it is unlike the knee-jerk or the blink, which are purely reflexes. What happens at the point of higher command is the more important fact about instinctive behaviour, while the less important facts occur at the periphery. With reflexes the exact reverse is the case.

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[1] This seems to me a logical deduction from M. Ribot's theory of motor memory. See his *Vie Inconsciente*, p. 58 and elsewhere.

[2] *Population Question*, p. 47.

Instinctive behaviour, more particularly in animals, has the closest possible relation with their sensory organization and no less with their motor structure and instrumental equipment. Allowing for some intelligence at the central point in any animal, the application of its instinctive activities is chiefly characterized in three ways:

(1) by the stimuli coming through afferent nerves, as in hunger;
(2) by the nature of the motor activity excited, as in running or diving;
(3) by the nature of the instruments available, as teeth or claws.

By taking the above three representative classes together, it is easy to see how essentially different is the human method of reaction or behaviour. In lieu of three classes, in the human counterpart to animal instinct there would be one. A general method would take the place of separate contrivances. Instead of reacting in a sudden and crude way by starting to pursue or flee as would a dog or by rising to fly as would a sparrow, there would be an instinctive reference of many needs or dangers to the central intelligence. That central reference is not always immediate in time, but in man it is almost certain eventually to come about.[1]

The strict co-ordination of means to ends in instinctive behaviour is the necessitarian origin of most of its characteristic features. Instinctive activities are common to a whole species, or at least to one sex of that species, because their environment is exactly fixed for them and they are exactly fixed to their environment by their needs and chiefly by their supply of food. Response has to be co-ordinated to stimulus. Since needs are stable, the responses are very minutely fitted by the school of nature, almost as if, or even more so than if, they were calculated. So we have the parasitic and ingenious methods of providing shelter and food for the young effected by the *Sitaris* beetle on the mason bee or by the *Sphex* on the cricket, which was the favourite example of M. Bergson.[2]

These are cases where the methods of response to need are so involved and roundabout that the ends do not appear until they are accomplished. The marks of intelligence and purpose remain, so to speak, buried in the mechanism of fixed sequence, until the solution of the problem has been attained.

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[1] See specific case discussed in beginning of Chapter IV.

[2] These instances are quoted in a general way, but it is fair to note that many examples of instinct have been given in the textbooks and elsewhere, where the accuracy and intelligence of the insects, etc., have been greatly exaggerated—notably that of the *Ammophila* wasp mentioned by Fabre, whose assaults on grubs as food for its larvæ are known to be inaccurate and inefficient, or at least a great deal less accurate than they were at one time supposed to be. (Quoted by Mr. Bertrand Russell from Drever, *Instinct in Man*, p. 92.)

Sir John Parsons aptly remarks that, though we may be astonished very often at the ingenuity of a given solution, a more 'remarkable feature of the simplest types of instinctive behaviour is often the orderly sequence of events rather than their inherent complexity'.[1] In all cases the orderly sequence is a double sequence; subjectively, one of instinctive original cleverness in adaptation, and, objectively, the absolutely stable sequence of events which have to be apparently studied and combated. The necessary correspondence is maintained by 'the remarkable constancy of similar relations in the midst of everlasting change'. [2]

The stability of the counter-sequences or the reciprocating series of problems and responses, as we may call them, is the condition which makes possible and necessary the stereotyped character of the regulation pattern stamped on all kinds of instinctive behaviour. At its first exhibition instinctive behaviour has to meet dangers absolutely unknown, its character is therefore determined prior to experience; yet in advanced animals instinctive reactions are not so stereotyped that they cannot be modified to suit variations in recurring similar situations. In man the instinct to use his brain has under special circumstances gradually replaced many minor instincts and made most of them modifiable according to particular necessities.

In earlier prehuman stages instinctive behaviour had to be perfect at its first appearance. Completeness is of the essence of perfection, wherever danger must be met, because destruction is the only penalty of failure. Swiftness and completeness of execution are the two useful marks of simple instinct in all doubtful cases of human conduct. It is an instance of the end explaining the means. Even in advanced and highly developed instinctive behaviour in human relations the rather sudden appearance of complete and unalterable determination provides a clue and explanation for conduct which often appears unreasonable.

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[1] *Introduction to Perception*, p. 23.

[2] *Ibidem*, p. 242. These brilliant and incisive criticisms of Sir John lead me on to the suggestion that any instinctive series of actions have been perhaps built up under evolution in exactly the reverse way to the construction of a series by pure intelligence. A man meeting a difficulty by intelligent purpose would visualize a danger and construct a series of actions by proceeding from a plan (*a*) through devices (*b*) and (*c*) to (*d*). While a million generations of beetles would have their instinctive series built up for them backwards. A particular species of beetle would survive by performing action (*d*), but ultimately only those of the species would survive who acquired the trick of arriving at (*d*) by the process of (*c*). Subsequently survivors would be selected who acquired (*b*) before (*c*) and (*d*) processes. Finally the eminent Sitaris or Sphex would have learnt to survive only by unconsciously performing an apparently complex but really simple series running through four processes of order (*a*), (*b*), (*c*) and (*d*). In animal instinct the apparent plan emerges last.

A less sure guide for the detection of instinctive behaviour, which applies chiefly to man, lies in the accompaniment or not of his actions by unconsciousness of purpose during its performance. Instinctive activities are for the most part unconscious until complete; but they are so often mixed with emotion and modified and coloured by the interference of reason, that it is often difficult to say whether any complex instinct is or is not mainly unconscious.

It is more safe to say that instinctive behaviour, especially in the form of separate instincts, is generally independent of the will. Dr. Jung, whose analysis of human nature is very acute, writes in his *Psychological Types* as if this were invariably the case. He likens instinct to a ready inner mechanism, releasable by a spring which certain external stimuli or inner impulse can set in motion, but not the will. Yet perhaps he does not sufficiently allow in human beings for mixed states, where instinctive behaviour plays its part in conjunction with reasonable purpose. Much joint social action, for example, consists of instinctive impulses reinforced by voluntary and reasoned effort. It is impossible not to believe that encouragement of this character, especially mutual incitation among a group, will not arouse allied instincts acting in the same direction.

As to pure cases of failure of inhibition by the will against instinctive impulses, there is no lack of examples. They are a common feature in the experience of most of us. The will is asleep until the force of instinct has gathered strength and instinctive behaviour is already half-way on its course. Only exceptionally firm character and practised will-power will then be able to control it. It is thus a frequent result of unfortunate concessions to the energy and unexpected character of instinctive impulsions towards unwonted instinctive behaviour, that the suggestion is imparted to the surprised will of having acted under the influence or compulsion of an alien and hostile personality.

Instinctive behaviour, when observed in men and more particularly in animals, reaches its end by methods which do not belie the presence of intelligence, but are the exact reverse of those employed by conscious intelligences. The latter, as in man, visualize their end and are hesitating in their means, often trying one device after another unsuccessfully. Observers of the former are convinced that the operating intelligence, whatever its source, is concentrated on means and is less concerned with ends. Some students of animal instinct even hold, on evidence that I consider to be as yet insufficient, that instinctive behaviour is universally or generally carried on in ignorance of the purpose of a long series of useful actions, even while they are being performed.

Whatever may be the full truth as to this particular point, we are almost bound to conclude that, since the action comes forth, so to speak, ready-made, the apparatus which produces it must be inherited and the aptitude for appropriate response to fixed stimulus must be innate.

How the exact correspondence has been effected between the complex and orderly sequence of circumstances on one side and the necessary, vitally necessary, successive responses on the other has never yet been quite satisfactorily explained. Possibly a single form of explanation will not suit all kinds of cases.

That trained observer, Sir John Parsons, has put the case very well so far as animals are concerned, but less well for human aptitudes. Still it must be admitted that, if men have more instincts, regarded as units, than animals, they are far less dependent, speaking generally, on instinctive behaviour for survival. We may solve the difficulty in the case of man to some extent by allowing a freer play than in the case of animals to the original formative intelligence of instinct itself in the first place, and in the second by presuming a further remoulding of instinctive impulses by a control from a higher centre. The scientific phrase would be: 'by backstroke from the cortex.'[1]

Sir John's words are: 'similarity of relations, everlastingly recurring, has moulded neural dispositions, which have been transmitted; so that like presentations cause like responses.'[2] Here the problem of transmission has been shelved, but Sir John elsewhere admits a negative attitude towards the problem of inheritance of acquired characteristics. He confesses himself unable to explain the theory of space-perception, 'except on the hypothesis of the inheritance of biologically useful characteristics.'[1] Finding himself 'navigating the troubled waters between the Scylla of Lamarck and the Charybdis of Weismann', he refuses to take sides. He invokes, in partial solution of his special problems, a further hypothesis which may be held to have a wider application. He believes in the existence of an intelligence, subject to development by selection, which may or may not be always conscious, which indeed, if it is now unconscious in man, may have been conscious in the ancestral types which preceded him in his evolution.

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[1] This special and very difficult point is elaborately discussed in the earlier part of Chapter XX.

[2] *Introduction to Perception*, p. 242.

The hypothesis, which was formulated by Sir John Parsons in order to meet the minute technical difficulties involved in the explanation of space-perception, not only seems to prove his particular point, but to my mind solves far greater questions than those which he has raised himself. His argument holds good for more than he meant and applies also to the wider problem of instinctive behaviour in general.

There seems to me no need to invoke the inheritance of acquired characteristics in order to explain the perfection of instinctive behaviour. Set side by side with the orthodox physiological doctrine that acquired characteristics cannot be transmitted, the hypothesis of a native instinctive intelligence will account for the problem of double inheritance.

We have the external mechanism of sensory receptors together with appropriate instruments of response evolved in the animal body by selection after trial and error. We have also an unconscious or imperfectly conscious intelligence of an instinctive order being developed by selection after trial and error in the internal neural organs of vertebrates. We find this duplicate co-ordination leading through a succession of fixed environments to produce an ascending series of mammals. The full development appears in a human system, where the instinctive intelligence becomes almost independent of any change in environment, because it has a plastic and adaptive body on one side and a generally adaptive and superior intelligence in the human brain on the other.

Sir John Parsons has followed a line of research in comparative anatomy demonstrating the progressive development of individual organs in vertebrates towards the nature of the equipment which we find in man, showing a close alliance between strong affective and instinctive tendencies in behaviour and a nervous system whose elaborate sensory equipment has become concentrated in the mid-brain and optic thalamus.[1] He does not, however, draw the implicit conclusion that in these special organs there is to be found together with a high sensory capacity the elements of the special intelligence whose directing assistance in evolutionary progress he had himself invoked.

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[1] *Introduction to Perception*, p. 146.

Yet it is probable that such is the logical and inescapable consequence of his reasoning. Apart from much mental evidence tending in that direction, to which I shall refer later, it is impossible to suppose that progressive signs of intelligence can be shown in connection with the developing area, where instinctive activities are supreme, while implying that at a certain stage the connection between these intelligent symptoms and the successive changes in their location comes to a full stop.

There is good reason to conclude that this has never been the case. The thalamic region in man has not arrested its development, and has probably not therefore discarded that form of instinctive intelligence which had served it so well in the past. We have quite reasonable ground for believing that all our powers of intelligence are not concentrated in the cerebral hemispheres.

Something of the kind may inferentially be drawn by way of admission, I certainly believe, from another passage in Sir John Parsons's summing up as to the control of instinctive behaviour in man. 'There is a large body of evidence, which has accumulated in recent years, tending to show that pure instinctive activities are carried out without any participation of the cortex of the cerebral hemispheres.'[2]

Before investigating the source and location of instinctive intelligence in later chapters, let me turn again for a moment to the question of language and exact terms. Instinct, instincts and instinctive behaviour are three allied but different subjects. In instinctive behaviour we find special characteristics which argue the existence of an inherited bodily mechanism, co-ordinated with an inherited form of intelligence, which is not predominantly conscious and is probably not seated in nor even concentrated on the brain.

In the next chapter we shall examine a series of separate instincts as units, especially in animals, in order to ascertain whether any indications of a special form of instinctive intelligence are to be found in connection with the unit-instincts, either together or separately. It will be suggested that unit-instincts should be regarded as convenient forms for investigation rather than anything real in themselves.

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[1] *Perception*, p. 94.

[2] *Ibid.*, p. 18.

Again in a later chapter we shall look for a special instinctive faculty, searching if we can find in it the required form of perhaps limited intelligence, apart from the developed intellect or the operation of the hemispheres of the brain, which will explain some of the peculiar features of the mental problem set before us in examining the character of instinctive behaviour.

The existence of a general faculty of instinct has often been assumed without any definite description of its character. The philosophical tendency has been in that direction. On the other hand, physiologists and that school of psychologists who concentrate their attention exclusively on behaviour, have come to study instincts separately, to regard them as the sole units of reality and inferentially thus to relegate a faculty of instinct into the limbo of indistinct ideas.

Should the certainty of such a faculty of instinct appear, it would explain the central unity of instinctive behaviour which to all appearance runs through the conduct of men and animals. We may ask ourselves frankly, whether instinctive behaviour is intelligible without it, whether it is not a hypothesis necessary in order to maintain the idea of instinct as a real phenomenon, and whether comparative anatomy does not at least provide evidence of adequate corporeal machinery sufficient to maintain a mental or semi-conscious hypothesis of the kind.

Comparative anatomy alone will not offer a basis for a hypothesis of instinct-faculty to account for the unity of instinctive behaviour. So far as those animals which resemble human beings to a moderate degree in cerebral structure are concerned, we can see a parallel between instinctive behaviour and a certain location of definite small organs, which is instructive and helpful to our understanding of human mental character. But in another order of creatures, the insects, the parallel breaks down so completely that it leaves us bewildered. We see an immense development of instinct and no kind of organs whose working rules we can comprehend. The hypothesis of instinctive intelligence being definitely related to particular structure breaks down for want of evidence at just precisely the point where it should enter its most interesting phase.

There are three lines of evidence available from structure towards the comprehension of instinctive behaviour. The first leads up through a succession of vertebrates and mammals, about which we know a great deal; the second is concentrated in the structure of men, about which we know less; the third relates to insect life and organization, where any analogy with the other two lines breaks down.

The life of instinct is incomparably better developed in just those creatures which have no parallel structural development worth mention in comparison with that of man. The lives of bees and wasps, the social organization of ants and termites, have been studied in the minutest detail by Fabre and other observers and expounded with insight and eloquence by M. Maeterlinck, without offering the remotest relationship with or suggestion of common solution of any problems that might be supposed to be similar to those of man.

But have we not here an argument for an instinct-faculty of a definite but self-determinative order? The instinct-faculty is there in insects, but it carries within it a self-sufficiency that has come to the edge of its own limitations. It has not ended in decay, but in a disastrous completeness.

On the basis of evolutionary development, which few would now deny, have we not a case of a faculty of instinct slowly developing in creatures with organs differing fundamentally from ours, in that they had no elasticity, no capacity for modification,[1] no reserves for healthy variation? We do not see in them a phylogenetic history leading towards the development of the cortex of a brain which will rival the human cerebral hemispheres. We do not see even the first steps taken in that direction.

In certain insect-creatures the instinct-faculty has, to use a sporting phrase, 'gone the limit', reaching remarkable results of their kind with inadequate mental machinery. They have come to a full stop in their hives and their ant-hill communities at a point in their social progress where the reasons for their sudden arrest are not plain to us. We are not going very far towards an explanation in saying that the causes of their comparative failure lie in the inherent limitations of the instinctive faculty, perhaps in some fashion which makes instincts of all kinds peculiarly the instruments of a blind social tyranny.

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[1] The reader may like to compare at this point what Sir John Parsons has to say on 'potential or static plasticity'. (See *Perception*, pp. 65–7 and elsewhere.) In all early stages plasticity implies wide opportunities of development. As capacity of development gains in force and becomes, so to speak, dynamic, like a torrent in a narrowing bed, early potentialities are one by one rejected. Every rejection implies a degree of fixation. Mankind has preserved plasticity to a degree surpassing that of all other animals.

CHAPTER III

INSTINCTS CONSIDERED AS UNITS

Of the three branches of subject-matter covered by the inclusive term, Instinct, instinctive behaviour is the most comprehensive. It is, in fact, almost too comprehensive. All the exhibitions and expressions of instinct are comprised within it. If instinct is not shown either in action, speech, or emotion, it is usually considered negligible. Behaviour embraces so much that it presents no unifying principle to reconcile diverse habits and practices. We need some more particular form of definition.

The second part of the subject includes most of the minute acts and responses to stimulus which are generally held to be separate instinctive units, all of the same kind in the same species of living creature, units which make up more comprehensive plans, patterns, or policies of conduct, aggregates which may or may not be considered in the end to be more important than the separate performances of which they are composed. The convenient word action-pattern is now frequently used to denote the little scheme of conduct which unifies the group of similar responses to similar situations.

The third part of the subject will concern a greater psychological feature common to all instinctive behaviour and to all units of instinct. As it probably existed before any separate instincts, it may be considered as a prime force, anterior to reason and possibly anterior to consciousness. Logically, however, it will here be assumed as a deduction from the study of instinctive behaviour as a whole and as the sole means of satisfactorily explaining the general use of such a broad term as 'instinct'. It has to explain actions so far apart as the general social organization of bees in a hive and the particular primitive suckling of a small creature at its mother's body or breast.

This is the instinct-faculty. No one has done more to idealize its comprehensive power and all-embracing influence than M. Bergson. As a source and expression of the general 'sympathy' of nature he has endowed instinct with moral qualities. As the ally, the partner and the secret inspirer of the cognate faculty of intuition he has raised it above all intellectual qualities. On these heights it is difficult to follow him, but in my opinion he has proved its unity and reality. After the acceptance of the hypothesis of a faculty of instinct, all instinctive behaviour sinks back into a lower rank, much of the parallel interest between animal and human separate instincts falls to the ground, and the whole subject of 'instinct' acquires an enhanced interest and becomes an integral part of the study of the human mind.

An immense amount of effort has been devoted to the study of separate instincts in animals and men, but for want of clear distinctions between the three aspects of instinct, on which stress has been laid here, no safe deductions have been made as to what parallels can be usefully drawn between this phenomenon in human conduct and the habits and actions of other creatures. Now it may be firmly stated that, if there be any instinct-faculty, it must be common to instinctive behaviour of all kinds and be a necessary characteristic of animal as well as human instinct. But, on the other hand, so far as separate instincts and unit-instincts are concerned, the only analogies that are valid between human and other conduct will relate to those creatures whose sensory and motor structure has some definite and consistent affinity with our own.

For the sake of brevity let us for the moment regard only two great groups of non-human living beings: insects, where instinct is all-powerful; and vertebrates, where instinct seems to be tentative and incomplete with a tendency to approach human standards of intelligence.

With bees, wasps, ants and termites we have nothing but the remotest sentimental connection, an admiration of their industry and a curiosity as to their customs. With the humblest mammal and most vertebrates there is recognizable a beginning of common development, a feeling of family life, a step on the path of progress in the human sense. It is only in the latter class that we can look for the kind of separate instinct that can be suitably named a unit-instinct of instinctive behaviour, some element of inherited practice which will make the separate group-instinct an item of intelligent behaviour, just as the unit-reflex is itself an item of instinct. Here in the sure field of comparative anatomy we find a body of evidence which, if animal behaviour is closely correlated with the progressive adaptation of their organs, will provide us with a series of double inferences, throwing light also on the unconscious elements in human instinctive behaviour. Anything short of this mark is devoid of usefulness for purposes of mental comparison.

It is not until we come to human instinct and to that kind of human instinctive activity which is worthy to rank beside reasonable and intuitive effort, that we arrive at something which deserves the name of mental operation. While animal instinct is of the nature of mind, mind itself and mental effort it is not, whether it be conscious or not or half-conscious in the way in which Sir John Parsons suggests. Instinct in animals is not subject to the light thrown on it by self-knowledge, as it is in human beings.

How far short of useful comparison with human mental states some kind of animal instinct may be will become clear after a brief digression into a few features apparent in the instinctive behaviour of insects. In insects co-operation by instinct has to take the place of communication by intelligent signs. Whole communities or sections of communities follow the same action-pattern simultaneously in order to obtain food, build shelter and secure the rearing of their offspring. Any individuality or fancy is excluded and innovators are left to die like outsiders, if they are not killed. Apparently there exist no desire for invention and no aspiration towards a managing intellect.

Some interesting light has been thrown on this generic instinct and its limitations in bees by Professor von Frisch of Munich,[1] who has been studying the colour-sense and sense of smell in bees. He tested them by grade experiments in colour and scent and discovered that they were provided with a range of capacity surprisingly close to that of human beings. In scent detection they appeared to have the same appreciation of shades and degrees as ourselves, neither more nor less, while the list of their visible colours was very close to our own with only two differences, one at each end of our scale. While they were weak or blind in response to red, they seemed to have one more colour at the violet end of our visible rays.

What appears to be new as to their instinctive ways is to be found in his interpretation of the dance of the bee after a successful find. When bees have discovered a fruitful field of nectar they announce it on their return to the hive by a sort of round dance.

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[1] From a report given in the *Manchester Guardian* of a lecture delivered in London during 1927.

The bees seem to dance only if they have found nectar in great abundance, and the greater the abundance the livelier the dance. If the source begins to be less fruitful, the returning bees dance less; and so a sort of automatic series of crop statistics guides the community in its labours.

The object of this dance is presumed to be not elation, but the distribution from their body-hairs of coloured pollen and scents to their fellow-workers, who are thus advertised by their friends of a fruitful garnering district in the near neighbourhood. At the same time by colour and scent their companions are told the kind of flowers they may expect to find. The rest of the hive engage in a series of expeditions of a hit or miss character, until all have the key to the new El Dorado.

How much more extraordinary does this method of communicating news appear, when we reflect on its roundabout character and receive the natural inference that by no other sign or private hint given or received is the receptive and enquiring instinct of each bee amenable to the informed instinct of its neighbours! Can we conceive of any creatures like ourselves so mentally walled in that no closeness of co-operation nor intercourse can transfer such a vitally important secret from one head-box to another?

Is instinct, then, a form of intelligence? Yes, it is; because it must be so. Yet what a difference exists, not of degree but of all significant quality, between the instinct of insects and that of man! There is here no evolutionary promise of the transmutation of instinct or of the propagation from it of an instrument of reason. The insects have given up the prospect of reason, if they ever had a line of approach open to it. They have developed their sole faculty of instinct to its full capacity and we see clearly where it has led them.

How appropriate to such an isolated and frozen condition of evolutionary standing is the passage quoted from the *Traité du Vide* of Pascal by M. Chevalier! 'Tandis que l'animal est rivé par l'instinct à une science bornée, toujours égale—car les ruches des abeilles étaient aussi bien mesurées il y a mille ans qu'aujourd'hui—il n'en est pas de même avec l'homme, qui n'est produit que pour l'infinité. . . .'[1]

To find any kind of instinct-units we must look to the behaviour of vertebrates and especially of mammals, leading by gradual stages to the instinctive behaviour of man. The progress of responsive capacity to stimulus is clearly marked by the improvement in corresponding structure revealed to us by comparative anatomy. But in following the stages of improvement we must not expect to find the concentration of the final solution of the problems of instinct, whether of behaviour or of semi-independent response to stimulus, in the human cerebral hemispheres. The important centre of instinct in man is identical with that of the higher animals in the complicated, but co-ordinated, group of minor organs in the lower brain.

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[1] *Vie de Pascal*, p. 74.

The first difficulty in exploring instinct-units is to obtain a sound and complete definition of 'an instinct'. According to one interpretation that definition is pretty nearly out of reach. 'The pure instinct', as Sir John Parsons writes, 'is probably as much an abstraction as the pure reflex, but if it is difficult to find a pure instinct in the lower species, it is even more so in man, even in the child. This is largely due to the immaturity of the new-born mammalian offspring.' [1] Instinctive reactions, as apart from instinctive behaviour, are not a separate kind of occurrence. Under close inspection of their origin they emerge from amidst a cloud of compound reflex actions, from which physiologically they are indistinguishable.

Even in their early beginnings there is something about them which savours of a kind of intelligence. As they become gradually more apparent to others and especially distinguishable to ourselves by being semi-conscious, they are noticeably accompanied by feeling. At the other end of their line of development they tend to become chargeable with feeling to an extent that they are, as Dr. McCurdy admits, strictly speaking inseparable from emotion. We know, we know instinctively, as we do and can very well say, that an instinct is not an emotion any more than it is a reflex, but at neither end of the scale of instinct can the boundary line be sharply drawn. An instinct is a complex of compound reflexes, subject to intelligent guidance of a special order and charged with feeling to the extent of being almost an emotion. An emotion expressed is probably the escaped charge of feeling that normally accompanies a repressed instinct.

An instinct has been loosely defined as an inborn association between a definite stimulus coming through one of the higher centres and a bodily activity. It is the joint product of living afferent, central and efferent mechanisms with an accent on the central link. But from the point of view of accurate definition, where lies the critical factor? Shall we say that it is the nobility and rank of the higher centre which controls instinctive behaviour? It is probably neither the cortex above nor the spinal cord below, but the influence of the mid-brain and thalamic organs which constitutes the essential adjusting mechanism. To say that an instinct is a unit of instinctive behaviour which is determined by the instinctive faculty, whose seat is in the centre of instinctive influence, would be arguing in a circle. An instinct is a separate assertion of an act of energy of a particular kind whose origin we shall investigate later.

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[1] *Perception*, p. 16.

Assuming for the sake of demonstration that there are separable instincts, subject to some provisional definition, we have to select only those from the vast number available which are reasonably pure in the scientific sense, isolated from the influence of other forms of intelligence and not contaminated by acquired experience or by the teaching of the parent. Even that is no easy matter. In all developed living creatures we may adopt the dictum of Sir Charles Sherrington, that 'it is not usual for the organism to be exposed to the action of only one stimulus at a time. It is more usual for the organism to be acted on by many stimuli concurrently and to be driven reflexly by some group of stimuli, which is at any moment prepotent in action on it.' [1] It is evident, therefore, that the simplest kind of instinct is a compound impulse of which reflex reactions form the greater part, wherein some central influence occurs, which gives to the whole compound a specific character. Thus we come back always to a central specific instinctive faculty, in order to explain the nature of instinct.

The second interpretation of separate instincts is to take them as items of instinctive behaviour in groups of a similar kind. Here we are faced with the preliminary difficulty of enumerating the separate group-instincts attributed to men and animals. Some authorities, such as G. H. Schneider and W. James, declare that man has as many instincts as any of the animals. Others again, among whom, I believe, are both the American writers, Woodworth and Warren, maintain that he has far more. On the other hand, Lloyd Morgan says plainly of man, that 'of definite instinctive performance he inherits a smaller share than any other organism'.[2] So wide a divergence of opinion at the outset makes any general agreement about the nature of a typical unit-instinct of human conduct almost impossible. The expression, unit-instinct, must be adopted as a provisional generic term, convenient in use for a special purpose.

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[1] *The Integrative Action of the Nervous System*, p. 177.

[2] *Habit and Instinct*, p. 327.

Although criticism tends to show that unit-instincts are less real than either instinctive behaviour or the reputed instinct-faculty, it is undeniable that they have been more frequently selected for study than either of the other two. Let us assume that they are real units. They would be units all of one kind in a series common to groups called species—and sometimes sex in species—similarly performed by all the members of the same group under similarly recurring circumstances. It is the regularity and frequency of the concentric contact of all the elements of exterior compulsion which is the unifying feature in all cases. In any group of primitive animals the capacity of response was possibly self-modifying in origin, but it would probably soon lose all fertility in resource. Sameness is imposed upon it by the penalty of extinction or by the kind of failure which leads to extinction.

Classification of instincts has become almost a pastime, but no authoritative method of selection holds the field; chiefly because the subject-matter of any arrangement is more plastic than it appears to be. No system prevails for long. Take, for instance, the grouping on a biological basis of G. H. Schneider (1880), quoted by Sir John Parsons: (1) the procuring of food; (2) the preservation of life; (3) the care of offspring; (4) the mating for parenthood. Where does the occasional instinct for hoarding among animals and the supreme human proclivity for foresight, prudence and saving come under this scheme? It is one of the most powerful and persistent of instincts, wherever it occurs; but it seems to miss out whole species of animals and whole races and families of human beings. It is almost equally subject-matter for all four of the above sections, but it cannot be confined to any one group. As an instinct it is occasional but specific. It defies most classifications.

More modern groupings of instincts have come and gone. They have tried to meet the special perplexity of providing for animal organic needs on one side and reconciling them with human psychological inclinations on the other. Several equally good classifications of unit-instincts, predominantly human be it understood, are available. But none is impeccable, owing to the logical weakness of the unit-idea.

Useful psychological groups may be arranged on several principles. A division as to mental faculty or disposition would be to select: reproduction, dominance, protection, caution, power of generalization, as typical or special motive-groups. The point of view of emotion would give us as heads of groups: fear, anger, suspicion, sympathy for social welfare, etc. Reactions in behaviour as a basis might slightly vary the arrangement flight, pursuit, loquacity, acquisitiveness, play, etc. It is difficult to make any of these methods satisfactory, exhaustive or fastidiously critical of useful differences.

Perhaps Professor H. C. Warren's [1] classification covers the controversial points most satisfactorily. Elaborate as it is, he hardly gives sufficient prominence to a comprehensive group for curiosity and wonder, imagination and play, which provide a foundation for all the arts and the incentive to science and religion. While all these profound pursuits and studies are not in themselves instincts, their charm and ascendancy over human careers has no doubt an instinctive origin. In their advanced form, after being subject to considerable modification by intellectual influences, they still retain characteristic traces of their original source.

Warren has selected: (1) a nutritive group; (2) a reproductive group; (3) a defensive group. The latter inclusively covers flight, hiding, modesty and, finally, hoarding, a better attribution than most, but not entirely satisfactory. An aggressive group (4) includes resentment, domineering and rivalry. Perhaps the latter assignment is the weakest of all, because the purpose of rivalry is first and last reproductive; a male struggles for his chosen mate and subsequently strives to maintain his family on the competitive level of comfort, which his mate expects; it is not a question of the individual only but of the human group. Emulation and rivalry constitute a form of activity with many ramifications, which illustrates even better than hoarding the essential perplexities in classification of instincts.

Warren's last class (5) is labelled social and would probably exceed in comprehensiveness all the others together, overlapping not a few of them. Here it seems a mistake to include parental instincts. Surely they deserve to be a class by themselves, which it is extremely difficult to keep entirely separate from reproduction and rivalry. Gregarious instincts, shading off into tribal instincts, overlap family and social instincts alike.

It may seem invidious to attack an excellent and carefully prepared list without substituting a better one, but it is the idea of the unit-instinct itself that is to blame for the weakness of all endeavours at classification. Warren's list has to end, as they all do, with a long supernumerary schedule of instinctive tendencies, as imitation, playfulness, curiosity, acquisitiveness, dextrality, communications, artistic expression. Some of these should certainly rank as primary, notably play and curiosity. As for acquisitiveness, it is so complicated a proclivity that it would wreck any table of virtues, vices, not to speak of mere instincts.

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[1] *Human Psychology*, p. 106.

Professor McDougall's list from *Social Psychology*[1] would probably meet with very general acceptance, but it cannot escape criticism. His seven primary instincts include: (1) flight; (2) repulsion; (3) curiosity; (4) pugnacity; (5) self-abasement; (6) self-assertion; (7) parental instinct. To each of these is attached an appropriate emotion: fear, disgust, wonder, anger, subjection, elation and tenderness; an attribution of specific relations between instincts and emotions for which I cannot see sufficient foundation. Emotions are an essentially limited group, conditioned by powers of expression, such as: vasimotor and lachrymal reactions or associations of language and ideas. The deeper emotions are preparatory and have visceral accompaniments. Sometimes their expression is permitted by the instinctive faculty, but quite as often they are suppressed. In any case the enormous range of instinctive behaviour overlaps the ambiguous poverty of emotion on every side.

The first seven instincts are supplemented by McDougall with four secondary and advanced instincts: reproduction, gregariousness, acquisitiveness, construction. Most of us will share in Lloyd Morgan's surprise that one, if not two, of these did not appear in the primary class. I cannot help also supporting the latter's more general criticism: 'that any one of his instinctive tendencies appears to me to emphasize what is similar in a number of varied experiences, which are also characterized by much difference.'[2] It is a criticism, however, which must strike with almost equally telling effect on any classification of unit-instincts whatever.

Professor Woodworth of Columbia University is a psychologist who regards separate instincts as forms of activity having particular character and individuality apart from instinctive behaviour as a whole. I cannot admit that his distinction between instinctive behaviour and its units is well-founded. He has a very simple form of division for the units under three heads: responses to organic needs, responses to other persons and play responses.[1]

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[1] *Introduction to Social Psychology*, pp. 47, 81.

[2] *Instinct and Experience*, p. 113.

In the strong emphasis he lays on play he has opened up an avenue to a fundamental truth about instinct, too generally neglected. Instinct is in human conduct partly specific and partly preparatory in nature. Play is the chief case in point. A child practises his (or her) capacities in the form of play long before the end-result of any of his aptitudes becomes apparent to himself or even to those who, for educational reasons, are closely watching him. The human boy develops himself into a healthy animal for flight or pursuit, so that his responses acquire rapidity like those of an animal long before they are used seriously. He has to acquire it.

Co-operation and patience are practised at cricket and a mild brutality at football. Maternal solicitude is cultivated in the doll's house. Fashions, art and acquisitiveness are trained in the scrap-album and the stamp-book. Trickery is learnt at hide-and-seek or in playing 'Indians'. Calculation and perhaps meanness are developed over marbles and cards. In this way the natural hesitation in adapting means to ends, which is the human handicap imposed by the brain, can be to some extent remedied; the instincts tending towards certain practical ends are thus freed from inhibitions and perfected for rapid action. Quickness of response in particular is not one of the special qualities of the higher control of conduct by the intellect. The special object of practice is not so much the acquisition of knowledge as the removal of delaying inhibitions.

Responses to needs and persons do not automatically divide themselves, as Woodworth would suggest. They are not exclusive groups of natural instincts. Many forms of instinctive activity quite inevitably partake of the nature of both. Primitive life reactions, like reflexes, respond to immediate organic needs, but most responses of command, submission, shrinking, attraction are set going by persons and equally concern organic needs, even if the motive is not visible on the surface of instinctive behaviour.

A form of instinctive-mental activity extremely important, not only in the young but also in older people, which appears to have been totally neglected as an object of study, is the attitude we are all prone to take or encouraged to observe towards our own capacities and particularly to the control of or reliance upon our own intellect. In school we are sometimes invited to think. Outside school a contrary influence is subtle and all-pervasive. In games for all quick responses we are enjoined not to think. In discipline for military, social and sometimes for business purposes we are forbidden to think.

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[1] *Psychology*, p. 139.

For special occasions we are exhorted to rely on ourselves, to trust our own judgment or, alternatively, to rely upon instinct and sometimes to leave everything to providence or inspiration. A great deal of religious teaching is directed towards the deprecation of extreme logical conclusions being drawn from our fallible human knowledge. When a policy has been laid down or a plan of campaign projected in practical affairs, undue questioning and even critical reconsideration are discouraged. What may be called either the self of action or the self of inadequate thinking has to be given a free hand for the time. The intellect is relegated to a strict localization of function.

There is a great and possibly reasonable temptation to interpret these prevailing tendencies as two counteracting instincts,[1] either to encourage the initiative and executive powers or to limit the use of the intellect. We might include a third variation in a tendency to restrict the activity of all but particular forms of intelligence. There are perhaps even more equivocal cases, where the individual judgment is in conflict with some of a man's inner energies, where instinct urges distrust of reason, where no logic will avail to quiet doubts or hesitation, where intellect is once and for all discredited as an authority or judge on some of the highest interests of man. Finally, is there not the last resort, when the aid of the intuitive faculty is called in? If it be invoked to supplement the reason, well and good! If it be brought in to quell thought and reflection, danger may be ahead!

Here we are on the borders of a deep subject, which will come up for discussion more than once in the study of the relations between instinct and intuition. Are the two primary instincts, the first to use the cerebral intelligence and the second to distrust the intellectual and possibly the intuitive faculty, to be regarded as unit-instincts in any general category? Are they not worthy to rank conspicuously as single units with or without any general list, if any theory of separate instincts is to be admitted as worth discussion?

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[1] It might indeed be described as a conflict between instinct and intuition. In my opinion, however, instinct is so far stronger than intuition, that the latter has no probable chance of holding its own. It appears to me that instinct has a decisive power in all these cases.

To my mind they are certainly not to be treated as merely positive and negative features of the same mental operation. In fact, I go much further. Although I doubt very much whether the ordinary unit-instincts are definite enough in man to give us an opportunity of compiling a questionable schedule, yet certain primary activities of the instinct-faculty are worthy of being called instincts. Among these we must place foremost the instinct to use the cortex of the cerebral hemispheres in the capacity of arbiter or consultant, as a unit-instinct of the highest order.

The instinct to dismiss the services of our consultant in conditions of impatient perplexity or in order to increase our mere animal efficiency in rapid response to stimulus is no less a unit-instinct of prime importance, but of much lower rank in intelligent capacity. It has a limited utility in some crises, but it is liable to abuse. Possibly these two separate instincts are the only two manifestations of the human faculty of instinct which have the right to stand out as separate instincts from the general routine, which we are accustomed to call instinctive behaviour or general instinctive activity.

Between the unit-instinct and the instinct-faculty a half-way position is taken up by Professor McDougall with a definition which might perhaps govern both or fit either, without recognizing, as I do, an essential difference between the two. It is a psychological definition and therefore accentuates the general rather than the particular point of view, leaving the latter to the physiologist. An instinct is 'an inherited or innate psycho-physical disposition which determines its possessor to perceive and to pay attention to objects of a certain class, to experience an emotional excitement of a particular quality upon perceiving such an object and to act in regard to it in a particular manner or, at least, to experience an impulse to such an action'.[1]

The hand of the expert is evident in avoiding certain difficulties in this definition, but there are arguable defects from the physical side in the description, such as perhaps the coupling of instinct with emotion and more especially the failure to mention the immediateness and completeness for its purpose which is characteristic of all instinctive behaviour. A graver shortcoming lies in the want of balance between the two parts of the definition. On the one hand *an* instinct is a disposition, on the other hand all special character in the instinct is concentrated in the nature of the objects to which the disposition has to adapt itself. One is

[1] *Social Psychology*, p. 29.

tempted to put the difference in a familiar simile: supposing a soft wooden square peg were forced by a hammer into a small round hole in an iron plate, where does the character of the resultant round peg reside? Chiefly in its roundness, I should fancy, which is due partly to the force of the blow, partly to the softness of the wood in comparison with the hard iron and formally to the roundness of the hole. But the original disposition or character of the wooden peg, which would reside in its squareness, is the only feature abolished in the final result. It seems to me that the term 'disposition' only leads us half-way towards the truth.

Unless disposition is defined as a 'form of intelligence', which in instinct I have no doubt at all that it is, I cannot see how it can be an efficient cause of the end-result. Nor does the term 'psycho-physical disposition' adequately suggest the nature of an instrument, such as the sting of a bee, the tail of the beaver or the finger of a child, any of which are necessary to shape the modality of an instinctive response to an outside stimulus.

Thus the inner history of the instinct, which no doubt resides in an instinct-faculty, is by implication neglected by McDougall, if it is not entirely missed. On the other hand, the peculiar conformations of the animal instrument used in the response, like the tongue of the ant-bear, are hardly put forward with sufficient prominence as the formal cause of the end-result.

The psychological nature of the definition makes it primarily refer to human instinct. As applied to animal instinct it has the merit of suggesting that a single instinct is a member of a certain fixed class of acts, not originally stereotyped but eventually becoming so by selection in order to secure a high degree of efficiency. The nature of the act is prepared beforehand by inherited equipment of two kinds: (1) a mode of intelligence which recognizes the appropriate environment and lends itself to some degree of adaptation; (2) a set of instruments peculiar to the type of response required to meet the expected stimulus. Whenever the two are suitably combined with (3) a surrounding group of fixed conditions favourable to the maintenance of a particular form of animal life, we begin to find recurring series of stereotyped performances such as may be denominated unit-instincts. But their range is narrow and they are best exhibited in conditions where life has lost every other form of interest.

In considering the survival of a specific instinct among animals, such a one as we have supposed a unit-instinct to be, we have not only the two variables, (1) and (2), to take into consideration, but the third variable (3) of the external problem to be met. In one sense all three have to survive or continue. Thus (1) and (2) have to be sharpened together as instruments to suit environment (3). If the usual conditions of (3) do not regularly occur nor offer an invariable opportunity, like a stable source of food, to take its part in the survival scheme, (1) and (2) will ultimately perish together. Out of these three variable items (3) the conditions of living will become fixed first, as presenting a medium of existence to the creature; (2) the instrument will become stable slowly; while (1) the plastic intelligence need be the last to become rigid and to lose its power of self-modification.

As Professor Lloyd Morgan has said in his able book, *Habit and Instinct*: 'Not only is there inherited a given structure of leg and wing, but a nervous system through which there is an automatic distribution of outgoing currents to the several muscles concerned.'

In attempting to explain the survival of fortunate variations without admitting the well-known but still unorthodox theory of the transmission of acquired characteristics, Lloyd Morgan lays great stress on the peculiar aid given by the power of self-modification. The modifications as such are not transmitted nor inherited, but the ability or facility in making them will descend normally and may be increased generally by natural selection.[1]

There is one feature present in the evolution of biologically useful characteristics due to intelligence and not attributable essentially to anything else. That is the persistence with which any surviving species clings to its appropriate environment. The intelligence of creatures with limited instrumental endowments is confined to one chief duty, the maintenance of fixed similarity of conditions around them. Since outside conditions cannot practically be changed by lowly forms of life, only one course is open to their intelligence, to stay where conditions are suitable. Thus begins the cycle which Parsons describes,[2] where similarity of conditions everlastingly repeated mould neural dispositions and create suitable instinctive intelligence. Similarity of conditions also mould physical instruments for instinctive activities. Both instinctive intelligence and instinctive activity with suitable instruments keep the creatures in the unique suitable conditions which continue this moulding influence.

How man escaped from the triangular tie of intelligence, instrument and environment is more carefully considered in the begin-

[1] *Habit and Instinct*, pp. 310–21

[2] *Perception*, p. 242.

ning of Chapter XX. His way was opened by the special initiative of his instinctive faculty and later through the development of a separate cortical intelligence. His two forms of intelligence gave him curiosity and forced on him mobility.

Unit-instincts would not be units for our purpose, if they did not run in series. They are often periodical. Their periodicity may be regular and frequent or occur at distant intervals or be specially deferred for rare periods, as in the case of mating. The unit-instincts of animals are simple in nature and purpose, but often complicated in process, because they are not highly charged with intelligence.

The instincts of man are much less like unit-instincts. The nature of any human instinct-series and its course are not always obvious. As Sir John Parsons says: 'in man instinctive activities are so altered by experiential teaching that they are masked and have frequently been denied for that reason.'[1] The interference of a more highly-strung machinery of intelligence than is apparent in animals is a feature which continually interferes with the simple course of human instinctive behaviour.

In fact, if we had no other instincts to observe than those appearing in human conduct, it is doubtful whether we should not invent, in order to account for them, a wholly different set of generalizations than those of our present code. We might be tempted to place the centre of our observations and the resulting theory founded on them, not in those characteristics which recall its animal nature, but rather firmly based on the kind of faculty that we recognize as resembling intuition. More of us would worry ourselves in the very distinguished company of Descartes and Bergson, as to whether there were not some hidden identity between Instinct and Intuition, one being a form of the other due to emergence or resurrection after a period of quiescence or repression.

Personally I hold that the identity of instinct and intuition is quite impossible, but I admit to have been often intrigued by several perplexing features of resemblance. The difference between the two is based on the solid ground that we know enough about the physical and instrumental side of instinct to realize that intuition cannot be a faculty of the same order, as will become sufficiently apparent after further analysis of the two.

For the present I shall turn my attention to the immediately important proposition that instinct is primarily a faculty, being a form of intelligence whose method of working need not be altogether strange to us, since we have some knowledge of its family history. The prominence of the instinctive faculty will at once throw a considerable light on the nature of instinctive behaviour and relegate the importance of separate instinct-units, arranged in series, very much in the background.

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[1] *Perception*, p. 17.

There are two ways of looking at unit-instincts: either as a body of phenomena of great original importance, in which case we must regret that so little light is thrown on their special characteristics as differentiating them from reflexes and emotions; or as the most frequent form of expression in conduct of an instinctive faculty common to men and animals. The theory of an instinctive faculty is the only bond between the instincts of insects and those of human beings. Even so, much remains to be explained, particularly as to the physical organs of instincts in insects. Since we know a great deal about the machinery of instincts in vertebrates and mammals, enough to explain by comparative anatomy much that is mysterious in ourselves, it is strange that an allied instinctive faculty should be evident in insect life without any corresponding relationship in our bodily systems. It is a mystery, which must be left for the present.

My own opinion about unit-instincts is that they are a useful form of generalization, conveying hints of value in certain problems. They account for the middle or animal terms in a long series of behaviour-items, the outside members of which, both above and below, escape our analysis. We are enlightened about them, as we are aware of the range of colours between red and violet, while having to be content with half-knowledge both above and below. So there are many circumstances that are strange and undecipherable to us about human and ant-instincts, which seem clearer to us in the case of instincts of dogs and beavers and birds.

Such an opinion is not irreconcilable with the view that is now on the whole gaining ground, which may be traced back as far as the writings of G. H. Schneider and W. James. Instincts are recognized to be to some extent quantitative and occurring in ill-defined groups. If that is the case it may be maintained that man has as many instincts as any of the animals, if his are not so sharply defined as theirs nor so purely dissociated from more intelligent outside influences, such as no doubt do come down from the human brain. To instinctive origins may be referred many of the most powerful motives in human conduct. If perhaps the interference of the intellect may be held to be more and more frequent in human conduct of a mixed type, I am not at all sure that the primal energy of human instinct is growing less and less.

The contrary view that instincts are phylogenetic disutilities and troublesome vestiges of a prehistoric state, that are on the way to be discarded and should be repressed, is not acquiring fresh support. It is possibly a hasty generalization about the course of evolution of our bodily frame and has as much and no more validity than the belief of some physiologists that the optic thalamus and some other basal ganglia of the lower and middle brain are dying organs, slipping out of sight and utility in man. The evidence for the one theory is just about as weak as that for the other.

CHAPTER IV

INSTINCT AS A FACULTY AND ADVANCED INSTINCTS

It has become evident that, while instinctive behaviour in men and animals is a very real phenomenon, whose existence is admitted on the basis of some kind of fundamental unity, it lacks at present any very definite or convincing form of explanation. It needs a unifying principle which is not furnished by any theory of separate unit-instincts.

We are not carried much nearer to an understanding of the phenomena of instinct in its essence by the various generalizations under the head of unit-instincts. With close observation animal instincts can be easily classified, with the colossal exception of the specialized insect instinctive intelligences, which include vast social systems. Among vertebrates and mammals we begin to see a phylogenetic advance towards the human organization of instinct, but even a considerable approximation of their characteristics to our own in structure and behaviour does not afford us any very satisfactory analogies.

Consequently I am strongly tempted altogether to question the method of unit-separation in analysing human instinct. If in one direction it helps to explain the extra-conscious features of human instinctive behaviour, in another there is much remaining in conscious and unconscious behaviour to which the name instinctive is accorded, whereto no common unit-instinct is assignable. Unit-instincts are themselves less easily explained separately than instinctive behaviour can be as a whole. They are, in fact, only a form and an occasional form of instinctive behaviour and not to my mind the most interesting part of it.

The third aspect of instinct is the only satisfying one. No explanation of the other two aspects holds water without some combining and reducing principle which is pertinent to most living creatures, conscious and half-conscious. To bring insect-instinct under the same group of ideas as animal and human instinct, the only possible connecting link resides in an instinctive faculty which must embody the principle of intelligence.[1]

Like other faculties and forms of intelligence, the faculty of instinct has presumably a physical counterpart, an instrument whereby it is exercised. Leaving the problem of its cause and true origin for the moment out of discussion, we are entitled to look for its location, even if we cannot place it just there, where we most need to find its traces. In the present state of our knowledge we must renounce the effort to determine its seat anywhere specifically in the known organs of insects. Fortunately in the higher animals and in man there is now a large amount of evidence guiding us to the exact location of its function and suggesting its method of exercise.

The investigations of later chapters [2] will show it to be placed in man within the basal ganglia of the brain among a number of small organs of which the optic thalamus is by far the most important. A cognate problem will be that of determining the means of securing rapid and effective co-operation between the thalamic region of the lower brain and the cerebral hemispheres of the upper brain.[3] But before attempting in detail the more difficult part of our subject, the supreme exercise of the instinctive faculty by bringing in the deliberative operation of the intellect, let us make a digression and turn back to review by introspection the relations of the instinctive faculty with its simpler duties which have been touched on in earlier chapters.

The instinctive faculty has to control the employment of reflexes in the lower system of the spinal cord and the utilization of those superior schemes of co-ordination, which have been called the separate unit-instincts. Here we have an immense field of action lying for the most part in the physiological field outside the scope of the present study. It must not, however, be forgotten that all important and central motor-action is to some extent mental, because all the so-called 'voluntary' energetic impulses [4] have to use the motor system, whose physical starting-points are known to be situated in the cortex of the cerebral hemispheres.[1]

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[1] Cf. C. S. Myers (quoted by Lloyd Morgan, *Instinct and Experience*, p. 28), who regards 'the separation of instinct and intelligence as a purely artificial abstraction'.

[2] See Chapters X and XVII.

[3] See Chapter XVIII.

[4] It is a defect of the present work that little or no attention can be paid to the automatically controlled reflex motor system. In order to emphasize certain mental problems stress is laid almost solely on what is generally called the 'voluntary motor system', whose impulses originate in the cortex. On the other hand, Sherrington's work on *The Integrative Action of the Nervous System* should be referred to in order to appreciate how elaborately cortical interference is shut out from the lower motor centres and junctions by the infinite complexity of self-regulating motor apparatus.

Let us construct for a moment a composite instance of instinctive behaviour where the instinctive faculty will use the reflexes and their combinations in unit-instincts in a conspicuous way. Let us picture an old lady walking through a field with an umbrella and suddenly seeing a bull approaching her. After sensation and swift perception, let us suppose an instinct-faculty, using first several two-neurone reflex arcs, such as Professor Woodworth describes and illustrates,[2] from the skin to the muscles in spasmodic jerks, others to the lungs and so on; then a three-neurone reflex arc to the diaphragm through the spinal cord from the lung in deep respiration, followed by many rapid activities, circulatory, secretory and visceral of a far more complicated escape-reaction unit-instinct, accompanied with emotion; then by arm and leg innervations in running away from a presumed mad bull. Under pressure of fatigue we have next two or three stages of mental agitation tending towards relative calm, anticipating a still more complicated instinct to use the reasoning faculty as to the comparative advisability of running towards a near wall, or a distant gate, or of standing to open an umbrella, or of lying down to die.

In such a case of sudden safety-reaction to danger the initiative might, but probably would not, come from the brain, even for motor purposes. It is doubtful whether the mere sensory message from the eyes would pass first of all through the cerebral cortex at all, as in its previous passage through the optic thalamus it might arouse the native instinctive reactions without waiting for any cerebral approval or stimulus.[3] Yet the motor message to run away must pass through the cortex, but would probably not arouse any rational questioning, until during the act of running the release for thinking came later from the faculty of instinct. An opportune auto-suggestion would then arise that thinking would now be in order and that a hasty deliberation would be necessary as to the best of four possible courses.

The above I believe to be a true analysis of the relations between the instinct-faculty, the unit-instincts and the reasoned act under pressure of emergency. The reasoned act is essentially nothing but the ultimate result of the chief of all human instincts, the necessity for the instinctive faculty to have recourse to the very highest powers at its command, to use its noblest and most plastic instrument, to think and possibly to reflect.

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[1] See diagram in Fig. I for separate motor centres.

[2] *Psychology*, pp. 36–7.

[3] For explanation see Chapters X and XVIII.

The final decision, to have recourse to the higher brain and its stores of wisdom and recorded series of previous stratagems and escapes, is not one which can be started under the primal severity of blood-pressure and sugar-secretion. The early emotional feeling of intense and agonizing emergency has to pass into a comparatively quiet stage, where the governing instinctive faculty decides that the combined personality has 'time to think'. It is certain that thinking will not and cannot take place until the inhibition of the instinctive central faculty on the use of the cortex during the period of pressure has been removed. The removal may seem an act of despair, but it is none the less an effort of rapid but intelligent instinctive judgment.[1]

To find a comprehensive expression to govern the whole situation there is no better term than the one ready to hand in our first attempt to study this difficult and complicated subject. Instinctive behaviour will cover the whole series of reactions and actions, thoughts and judgments from the first moment of sensation passing into perception of danger down to the final resolution to grasp at, and perhaps adopt, a reasoned policy. Before we get lost in the mazes of the relations between instinct, intellect and intuition, let us remember to do justice to the fact that, long before unit-instincts were thought of, the older school of philosophers have always given a high place to the faculty of instinct and endowed it with the quality of intelligence.

The history of the faculty of instinct is respectably old-fashioned, yet not tinged with controversy like that of intuition. It is not clear, however, that, even as a faculty or form of intelligence, its unity has always been assumed. Descartes has already been quoted by Professor Chevalier,[2] as indicating a duality in instincts, and in the same sense we may refer to the following passage from Pascal. Men have 'un instinct secret qui les porte à chercher le divertissement et l'occupation au dehors, qui vient du ressentiment de leurs misères continuelles; et ils ont un autre instinct secret, qui reste de la grandeur de notre première nature, qui leur fait connaître que le bonheur n'est en effet que dans le repos, et non pas dans le tumulte; et de ces deux instincts contraires il se forme en eux un projet confus, qui se cache dans le fond de leur âme. . . .'[1]

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[1] The feeling and emotion of despair are not causative, but resultant from the consciousness of an acute crisis. In preparation for the removal of the instinctive inhibition against cerebration a peculiar act of instinctive foresight, no doubt merged in a reflex action, has already occurred. During the immediate emergency an extra supply of sugar has been poured into the blood, and at the same time a certain small quantity of adrenalin has been introduced into the brain by the thyro-suprarenal system. The conductivity of the brain will be increased at the same time as the energy of the body. (Crile, 1922,—quoted by E. Miller, *Types of Mind and Body*, p. 54.)

[2] *Vie de Descartes*, p. 171.

At first sight the duality of instinct described by Pascal, no doubt a serious duality, seems to have some new quality different from the animal and human duality mentioned by Descartes. It suggests for a moment a comparison between a primitive form of instinct and an advanced or educated condition of instinct; or it may indicate the dual instincts mentioned above as to the use of the intellect contrasted with the refusal to use it. Though a rivalry of the latter kind takes a conspicuous place in Pascal's philosophy, it is perhaps reading too much into this particular text to find it here. It is also improbable that, like Descartes, he interpreted the second kind of instinct to be *intuitus mentis* or an *instinct intellectuel.* He would no doubt have attributed to his second instinct a greater affective or emotional accompaniment, since he says elsewhere, 'un instinct que nous ne pouvons réprimer, qui nous élève.'[2] Comparing it with another passage, 'Instinct et raison, marque de deux natures,'[3] it seems quite possible that we have perhaps an early expression of the more modern view, which is being proved by time to have considerable fruit. He may be foreshadowing the existence in us of two forms of intelligence, one closely allied with high emotion, which he would identify as instinct; the other pure reason (raisonnement ou raison raisonnante), which may or may not include intuition, a subject or faculty, which he seems not to mention at all.

On the whole it is most probable that the kind of accuracy aimed at by Pascal in his distinctions was chiefly dictated by his own introspection and by the interpretation of the spiritual experience of his time. We cannot therefore quite disentangle his views as to the two kinds of instinct from the contrast which he makes between instinct and reason. It is significant that he seems to lay no stress on intuition, while on the other hand Descartes pays little attention to instinct. Descartes, the more philosophical of the two writers, erects intuition on a pedestal as the vehicle of pure truth. In effect both thinkers indicate a duality in human intelligence, although they describe it very differently.

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[1] *Pensées*, p. 139. [2] *Ibid.*, p. 411. [3] *Ibid.*, p. 344.

The natural contrasts in human nature offer a foundation whereon one kind of duality is very easily transmuted or transferred into another. Given two seats of intelligence in a living being, where one perhaps has an emotional power to reinforce it and the other is unhampered by affective conditions, we should expect to see one control the other and the first to use the services of the latter with some suspicion. Like a Roman patrician in the time of Mummius, who has brought home a Greek slave from the sack of Corinth, the instinct might employ the intellect to keep his accounts but would not trust him in matters of judgment or of vital importance except with great reserves.

The theory of an instinct faculty as a form of intelligence is very concisely put by a more recent French philosopher, M. Bergson: 'L'instinct achevé est une faculté d'utiliser et même de construire des instruments organisés; l'intelligence achevée est la faculté de fabriquer et d'employer des instruments inorganisés.' [1] Without endorsing all that such a dangerously epigrammatic expression implies, there is a great temptation to seize the happy form of words in the present connection. What better example of an organized instrument could be put forward than the superb work of the human instinctive faculty, which has helped to create step by step after infinite trial and error the twin cerebral hemispheres with their specialized convolutions allotted to projection areas and to motor areas, with their 30,000 or 40,000 association fibres and their 10,000,000,000 cells more or less? [2] And now that the instinctive faculty has at its disposal incomparably the finest mechanical instrument known to us, is it not to be expected that it will use the brain intelligently as a whole, leaving it as a free plastic instrument, to be employed or to be laid aside but not to be interfered with when it is in operation?

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[1] *Evolution Créatrice*, p. 152.

[2] I am not unaware of the fallacy concerning heredity which tends to accompany any attempt at personification of the instinctive faculty. I would urge in extenuation three valid considerations: (1) The instinctive faculty even in its very early stages is a potential personality, growing into potential consciousness and further into partial consciousness, as we now recognize it to possess in our human personalities. (2) The creative power which I credit to it by some picturesque anticipation is not asserted to be the *only* creative energy involved. (3) I assert the creative share of human instinct in the confirmation and adaptation of the cortex to consist mainly in the following performance repeated indefinitely through unknown periods of years: the avoidance of perpetual sameness in exterior conditions, so that the human organism was perpetually confronted with problems requiring adaptability and elasticity instead of rigidity in its organs, and especially in those organs which contributed to the growth of its embryo intelligence.

It is quite possible and even near to probability that, although the instinctive faculty does not much interfere with cerebral operations after they have been once started, yet it has never resigned all pretensions to modify reason in circuitous ways. In the infinite communications between the two, instinct, no doubt, puts pressure on the intellect and accepts in return occasional influences of an intellectual order in control over its own more dangerous propensities. It is certain that the instinctive intelligence, while generally presuming its own capacity, is quite aware of many shortcomings and recognizes them under stress of emotion during crises. The instinct of the old woman to think, while running away, is parallel to, but not identical with, the severer surrender made by the intellect in order to secure the help of intuition in a different form of mental struggle.

The relations between the faculty of instinct and its ally the intellect are not to be completely solved at this juncture. The problem must await also some investigation into the origin and validity of intuition, a subject to which the next three chapters will be entirely devoted. It is evident that the individual standing and relative powers of the instinctive faculty, of the intellect or reason and of the intuitive faculty must all be to some extent separately established before they can be considered together. Meanwhile some brief attention must be paid to a more developed variety or form of instinct which is evolved in co-operation with the higher organization of the intellect.

It would be rash to conclude that we are at the end of the refinements and divisions of a mysterious problem. Suppose now that there were a further kind of instinct, not coming within any of the categories already mentioned. By an advanced instinct I do not suggest a generic name for a formal kind of behaviour common to all men and the higher animals and characterized by those specific peculiarities which have chiefly this in common, that they are either specifically unreasonable, while being intelligent, or that they attain quickly just the sort of result which reason would be glad to accomplish, if it had the time. Nor is this fresh version of instinct an inclusive term for a whole class of elementary reactions of a primitive character, which have so many different methods of application that no one has succeeded in determining exactly what they are. Neither is it the title of an organic intelligent function, but rather a conspicuous instance of its exercise.

Instinct, when fully developed in man, is rather different from instinctive behaviour in general, from instinct-units in particular, and from the comprehensive instinctive faculty itself, of which it is only an expert demonstration. It is the source of a class of deep-lying social motives, which I have already named in the *Psychological Theory of Value*: 'advanced instincts'.

There is here, in fact, another and quite reasonable use of the word, instinct, common enough as a distinctive substantive, denoting not instinctive behaviour, including a group of continuous actions; nor a unit-instinct, which is one class or series of separate reactions; but a more settled form of instinctive habit or modified instinct, arising from a partially intellectualized attitude of mind, implying an experienced and perhaps sophisticated manifestation of the instinctive faculty.

Instincts of this solid order play a large part in social and political life. They are the foundation of all economic struggle and competition. Equally they supply the moral cement which prevents any nation being broken up by factions, and to some extent the larger community of nations being disrupted by eternal conflict. On the whole they exercise more binding force than they exhibit in their primitive centrifugal tendencies. In private character they appear as deep-lying instincts, compounded of fugitive instincts which have been long controlled and repressed. They are recognized by us among ourselves by their extra-conscious character and secret power. They are seen under various disguises, mingled with emotion and reinforced by habit, enshrined in deep-seated prejudice and effervescing with social sympathy, sanctioned by moral striving and confirmed by solitary reflection. Although they are universally referred to as instincts, with or without a special epithet, they are remote from being the kind of unit-instinct described in the last chapter. So far from being units, they tend to be, but need not necessarily be, collective instincts. The faculty of instinct working on unit-instincts uses the latter quantitatively, creating summarily out of them a composite feature of character.

Instances of this use of the term are not far to seek. It is possible that Pascal, in the passage quoted above, was feeling about for some comparison between simple and advanced instinct. They occur freely in speeches, leading articles and works of great literary value. A very good example can be taken from the writings of an intellectual giant and a great master of style. Ernest Renan, in his *Life of St. Paul*, writes of the peculiar gift in the early Christian churches for the choice of able and good men, showing a sound and wise opinion combined with community of devout feeling, rising superior to mere intellectual judgment. He describes these leaders: 'comme choisis par le Saint-Esprit, c'est-à-dire par cet instinct supérieur qui dirigeait l'Eglise dans tous ses actes. . . .' [1] If the special order of extra-conscious intelligence to which Renan here refers resulted in the inspired action of a single individual, it might be attributed to the intuitive faculty. Since according to his shade of meaning it is an act of joint intelligence, it may very well be ascribed to the instinctive faculty. Intuition governs the intelligence of individuals. Instinct has more power over collective action.

The case in question is put forward, however, not as an example of scientific accuracy, which was probably not the author's intention, but as a specimen use of the term in what we may very well acknowledge to be the great style. There is a similar passage later on in the same book: 'une sorte de bon sens moyen, un instinct conservateur . . .',[2] where Renan correctly uses the term, instinct, as embodying a certain community of human intelligence, which makes me believe that his choice of the exact word in both cases was not accidental. Many people in the same kind of context would have been tempted to use the word, intuition, with a different implication. Renan presents very well, in my opinion, a kind of single collective instinct, which could not be allotted under the head of unit-instinct, because it is essentially different. So far from being a basic unit for compounds, it represents a compound of basic units.

An even deeper division exists between unit-instincts and the single compound instincts which I have described. The latter frequently appear in men of long experience, quite frequently in opposition to that experience. They resemble the fruit of intellectual insight, but show themselves different by appearing spontaneously and often in unreasonable guise. These instincts have been long subject to cerebral criticism, to cerebral modification and to cerebral repression. Yet they continue to spring up unconquerable and vigorous as ever. They are the secret manufacturers of public opinion. They are essentially economic in character, because their aims are invariably practical.

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[1] P. 238.

[2] P. 291.

It is superfluous to attempt to find a new specific label for them, as no name would fit them completely. They are not necessarily composite like group characteristics, as they are present like prejudices in single individuals. They are more frequent in old people, but they may be present in the young of an old civilization, like the peasant population in a small country or in the caste system of India or among the *novi homines* of the Roman Senate. Let us call them for the present 'advanced instincts'.

Such instincts belong to the order to which I have referred in a previous work on economics, the *Psychological Theory of Value*, as specially governing the laws of economic life and determining value. Economic Value is an all-powerful attractive force, which controls the practical energies of all mankind, even in a state of war. Whereas formerly our statesmen and politicians, deciding the issues of peace and war, concerned themselves directly with the psychology of classes and peoples as regards their moral status at home and their relative national power abroad, leaving economic questions largely as negligible side issues, now they have to regard the feelings and instincts of the governed exactly from the opposite point of view. Economic interests have come to override every other. Behind every economic issue lie questions of value. Behind questions of value lies instinct. Value, controlling the laws of supply and demand, is purely and solely a question of instinct.[1]

The instincts governing economic value and, through that medium, the whole economic energy of the world are not the only advanced instincts, but among them they are by far the most influential and practically the most important. They act for the most part unconsciously, as do all the instincts. They are almost independent of intellectual control. In matters economic, as in all instinctive activities, the cortex of the cerebral hemispheres in man is the servant and not the master. The servant often does not know the whole of his master's purpose.

The three pairs of advanced instincts, which I have selected elsewhere[2] as guiding economic value, are probably fundamental, but I would not claim that they exhaust the list. I am convinced that instinct and instincts alone, to a predominant extent unconscious, constitute the real economic forces, which determine values, maintain the varied standards of living and comfort and decide the amount and distribution of population and the conditions of its survival.

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[1] See end of Chapter XX.

[2] *The Psychological Theory of Value*, p. 94.

Each pair of instincts is related in the capacity of being primary and secondary to one another. I should not call them necessarily and reciprocally opposite, but rather complementary and existing together on terms. The first pair are, Self-preservation and Accomplishment; the former aiming at survival only, the latter having some kind of aim at quality, as tempering the too great love of mere life.

The second pair are, Parental and Sexual; the latter being derivative from the former. As to these two, I hold most strongly, I might almost say, instinctively, to the conviction that mere sexual questions do not hold the grasp or grip on our unconscious selves which has been assigned to them in many recent treatises. An emphasis on sexuality is a mere aberration from the parental instinct, which has infinitely the greater influence on all economic questions, as affecting the family, the race and the future of mankind.

The third pair are the Dominant and Submissive instincts, which together form the true analysis of the supposed single instinct of Self-assertion. Stress on the latter has been particularly laid by Professor Woodworth [1] among the psychologists and by Dr. Adler [2] among the psycho-analysts, with whose views I cannot entirely agree. Self-assertion seems to me another name for dominance and is prevalent among dominant races. It is, however, surprising how many men and women in the past have not been self-assertive at all. In the progressive races self-assertion or a claim for dominance is encouraged among the young. When regarded closely it appears more clearly as a passing stage in education. The young, when left alone, are selecting themselves for leadership and the habit of moderate self-assertion is maintained through life under the name of self-respect. It is possibly not real, which is probably why it is so jealously guarded. Only one man in a hundred and one woman in five hundred have any opinions of their own. Every one is naturally dominant and submissive in successive stages, accepting leadership very early and easily without a sigh of regret.

None the less it is not difficult to see how prevalent the tendency to self-assertion, which is really the instinct of dominance under another name, may become among neurotics and hysterical patients. Disappointed originality, frustrated talent, thwarted ambition, exaggerated sexualism, all rapidly produce a diseased condition of nerves, where the pitiful aim of dominance is contrasted with the poor performance of the will. Dr. Adler's admirable analysis of this class of character is based on an immoderate proportion of unfortunate self-selected types of failure.

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[1] *Psychology*, p. 161.

[2] *Individual Psychology*, pp. 7, 28, etc.

It is curious how the ordinary submissive individual, who willingly accepts everything from the hands of others and particularly his habits, his opinions and his morality, desires among the dominant races that his acquiescence in submission should be concealed under the prevailing reign of equality. He has to make his little protest against accepting his normal task of conventional duties, before he begins proudly to wear his chains. Self-assertion is an appropriate name for the sub-instinct of dominance 'on the way to become submissive'. The spirit of contradiction is another sub-instinct of the same origin and class. Both are characteristic of unbalanced temperaments.

In economic life the morbid struggle between the traditionally dominant spirit and the independent feelings in submissive ranks is for the moment in progress, questions of leadership being more serious matters of dispute than the production of wealth or even its distribution. It is probably much more a phase of theory and traditional evolution than is generally supposed. The old submissive mass will return to its quiet ways, as soon as the new dominant class has selected itself out of the competing groups. The wars and recent inventions have added to the natural impatience of the young. Those who have inherited their motor-cars fool-proof and aeroplanes ready-made and a film-and-broadcasting education are a little more anxious than most generations to wrest the economic sceptre from the weakened grasp and shaken nerves of old Europe.

The problem naturally arises as to what connection advanced instincts have with the instinct-faculty. It has generally been held that very important advanced instincts, such as the above, or the group of religious instincts, wherein submissiveness and reverence play a large part, or the artistic instincts, wherein accomplishment, imitativeness and a restricted degree of self-assertion are powerful influences, owe their vigour to a particularly close relationship with the affective side of our nature, with its emotional content. The fact of an alliance is undeniable, yet neither emotion nor feeling is instinct.

Instinct is a form of intelligence closely allied by its physical origin with emotion but independent of it. Instinct is reinforced by emotion, but it is essentially more stable. When emotion is weakened by emotional expression, in other words by its physical discharge from the human organism, the power of instinct remains undisturbed.

The strength of the instinctive faculty lies in the persistence of its opinions, not in the quality of its intelligence, wherein it is no doubt inferior to the quality or degree of intelligence in the cerebral cortex. It is persistent, because it is, in fact, an unconscious or extra-conscious form of intelligence, retiring and almost secret in its processes. It is practically inexpugnable, because in its central reflections—if it ever does reflect—and conclusions—it certainly makes decisions—no other or outside form of intelligence can get at it directly to alter it or to convince it or to overcome it. It is one of the results of the persistence of the instinctive faculty that it seeks stability and permanence against all hazards. Our instinctive sympathy with others, which wishes to share common opinions and common aims, arises from this persistent craving for stability.

The instinctive faculty is the essence and the reality of instinct. It has an importance so great that the only question remains as to whether 'faculty' is a serious enough term to cover it. Yet side by side with the affective capacities for feeling and emotion and with the sublimer faculties of intellect and intuition, perhaps the term, faculty, may be allowed to stand. It is a term cognate with the inner recesses of the human self.

As to advanced instincts, they have a peculiarly intimate relation with the instinctive faculty, since they are its mature form of expression. They represent the full logical outcome of the development of its essential form of intelligence. Their unreasoning dominance over the more conscious processes of the intellect presents a proof of the occasional triumph of inner forces in ourselves, which we do not fully understand. The relations of instinct with intuition, the sister and parallel extra-conscious faculty, will, so far as we can uncover them, reveal some inner secrets, which are only beginning to be opened up. That is my hope and perhaps to some extent my expectation.

The first instrument or method of enquiry will be introspection. It has been used for so long, that no doubt it now needs fresh material. Another method of approach to the truth must lie in our confidence in the validity of psycho-neural parallelism, or, as it can be more briefly called, interaction of mind and body. If we can legitimately argue from faculty to organ and from organ to faculty, some vital gaps in either series of our chains of inferences may be filled. Much help may be obtained in due course from the examination of the brain itself and from the lessons which we are entitled to draw from the study of anatomy.

Before embarking on new and sparely-charted seas it is necessary to come to some provisional understanding about our code of signals and expressions. It is an admitted fact that certain psychical processes or inner changes, equivalent to and resembling what are known as 'mental events', may occur in human subjects without overt appearance in consciousness. Such phenomena are now usually described as unconscious or sometimes as subconscious processes. The latter term, which was invented in 1889 by M. Pierre Janet, is much better to my mind, but it has been dropped and is now out of date, perhaps because it became rather confused with another term, subliminal.

In Chapter XIV I shall discuss the limitations attached to the term, unconscious, which make me fall back on the more accurate term, extra-conscious. The latter figure of speech embodies a more solid simile, likening consciousness, not to a plane or flat level but to a central sphere by a spatial analogy. Around the ill-defined surface of the sphere lie the extra-conscious elements above as well as below and on all sides. The half-developed and half-clothed mental facts slip in and out on a single flash, like the swallows through a lighted hall in the old Anglo-Saxon symbol of our brief human life. At either end of its passage lies a moment of half-shadow. Only those mental operations, which begin and end within a certain mental distance, so to speak, of our central self can be said to occur fully inside our consciousness. All else is to be considered as extra-conscious. The greater part of the mental facts, which accompany instinctive activities, occur either in the half-light or in the full shadow.

Instinct is a vast subject. Several important subjects lie, so to speak, on the edge of it. Among some of the profound questions surrounding it there are points about the phylogenetic position of instinct which have hardly been sufficiently considered. Instinct evidently goes back beyond the evolutionary history of our organs, as witness the relative importance of instinct in insects. Is instinct in insects conscious or extra-conscious and to what degree is it either one or the other in the possible case of a mixture? We shall probably never know, but, even if we now knew all that was to be known about it, no present language of ours would cover the perplexing difficulties of the case. What William James called the 'blooming buzzing confusion', which we might expect to represent the semi-consciousness of a crawfish, would probably not correspond to the definite and finality-conditioned promptings to activity of a termite or a wasp.

In the known history of the progress of the mental organs in vertebrates and mammals towards the development of a human brain is there traceable a similar and parallel progress of the sensory and emotional organs, such as the optic thalamus and its links, wherein the closest associations with instinct can undoubtedly be found? The contrary cannot be maintained and the evidence of progress is probable.

In the complete human organism is the present condition of the physiological machinery associated with instinct a sign of perfection or a relic of imperfection? The question approaches so near to an even balance that some psychologists would call the instinctive mechanism a throw-back, others a matter of indifference, while very few, if any, would consider it an emergence of something new and valuable. I have not heard of anyone recognizing the differentiations of the mid-brain and basal ganglia of the brain as an advance. Yet if the progress made in the lower brain has been less than in the human cerebral cortex, why should we not recognize that very likely real development has also gone on below there, as perhaps everywhere else?

On the side of introspection, of philosophy, if you will, there has come to be a more frank recognition of the part played by instinct in human conduct and in human feeling and thinking. Nor do the philosophers all condemn it. Some have made special friends with it. Whatever we may say as to its desirability or not, there is no question of the importance of instinct and no sign of its importance diminishing. The unconscious or extra-conscious part of our lives has not lately been neglected. It is known to consist not only of reflexes, which facilitate action, but also of an enormous sensory system and of obscure memory images, which retain thought-patterns and reconstruct thought. Poor Hartmann,[1] writing thirty years before his time, unfortunately entangled in a kind of mystical and supernatural unity under the name of *the unconscious* all our tropisms and reflexes, our autonomic system and our instinctive reactions, our emotions and intuitions. Such a confusion helped to set the clock of due enquiry back. It is time that we began to see that the real importance and spiritual significance of all our cerebral organs is not diminished, when their foundations are disentangled and their functions are properly distinguished.

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[1] Author of the *Philosophy of the Unconscious,* a book which had a great popular success in its day. It has suffered perhaps unduly in reputation since.

If the instinctive faculty is very old, the present human instinctive machinery is respectably old, but I should refuse to consider it as old-fashioned or decaying. It is part of a rich organization, which is perhaps growing more and more inclined to delegate conscious processes to mechanisms and to allow them to slide into the ranks of half-conscious operations. Within the mechanisms the processes tend to become less and less conscious. They can easily be, as in many instinctive activities, extra-conscious except in their results. They may even be, as in cortical memory, totally unconscious, as far as we are concerned for ever and ever, unless they are recalled by some unconscious association or accidental recurrence. In both classes of cases the subject-matter concerned is beyond the direct reach of the will. There are many actions which we shall never do again, but which we know how to do if we had to; there are many places and people which we shall never recall, unless we were to come across them once more; there are a few instinctive acts of ours which each of us know that we shall never repeat.

Another question arises as to whether there is any essential novelty in human instinct apart from its relations with the progressive specialization of the cortex. There is no reason to look for, and I fail to see in the instinctive faculty or any of its manifestations, good evidence of a special emergence. It is the fashion to write of 'emergence' in a semi-technical sense, and no exception need be taken to the word. If it explains nothing, nothing on the other hand is admitted by it, except ignorance. The characteristic of an emergence is that whatever emerges makes a new compound, with qualities and properties which cannot be deduced from the known properties of its constituents, like the identity of common salt, which has no superficial relationship of resemblance with either chlorine or sodium.[1] On meeting an emergence we receive a start of surprise, as if two affirmatives were to make a negative.

Still there is a certain danger in the modern spirit, which is eager to welcome emergences. The title does not really account for anything and it may become too easy a substitute for an explanation. Nor does emergence abolish consistency or continuity in the past.

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[1] A comparison, which I venture to borrow from Dr. Broad.

In the history of instinct, if in all creatures we remark from time to time grown or growing symptoms of intelligence, it is probably because intelligence has always been there. Yet we do not equally find in instinct the traces of feeling.[1] The course of feeling, accompanying instinct as it does in a very intimate way in human beings, is quite different. Here there is a noticeable cleavage. In the insect world we see the minimal traces of feeling accompanying instinct, when and where intelligence is developed to a very high degree. We see no sentiment or organization of feeling. We see only corporate self-interest. We see progress indefinitely arrested.

The history of instinct among vertebrates and mammals leading up to man is different. The instinctive intelligence and its differentiating organs are growing slowly. Side by side in intimate relation together with them there is a development of sympathy and sentiment with a family as opposed to a tribal organization.

Here we have a problem whose origins are too far back to be treated inductively. We can hardly as yet burrow back to the dividing line between insects and vertebrates, in order to weigh the significance of their comparative mental or instinctive organs. It is possible that an interpretation may be afforded some day in that way, but it is not yet in sight.

For the present one explanation, for which I can find no evidence, might be attempted by supposing an emergence on the side of the vertebrates of special organs of feeling and sensibility, thus leaving the insect world short of a faculty and unequivocally dooming them to an ultimate evolutionary blind alley. The alternative, which I prefer, is less sensational. It presupposes only, what is likely enough, a common inheritance for all of us of the elements of intelligence and capacity for feeling in our primitive form of sensation. If in far ages past the more progressive insect tribes took a special path by concentrating on communist forms of intelligence and mutilating communist forms of sympathy, we can see that they would ultimately develop forms of intelligence that would be very different from ours. It would be, in fact, a choice of intention and not a choice of accident. How far it was accompanied by an embryo degree of consciousness we are not in a position to guess.

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[1] The term, feeling, is used in this passage in what is, I fear, rather a loose way to include sensibility. Sensibility was not in the earlier stages of phylogenetic development as differentiated as it afterwards became in human beings. (See later in Chapter XVI.) So I am entitled to use the term comprehensively. Nor am I referring at present to the more rarefied and exact meaning of feeling as opposed to thought. The duality of thought and feeling is dealt with in Chapter XII.

It seems to me highly probable that, on the other hand, in larger creatures the feeling capacities blundered on. In thus personifying them I should perhaps say that the intelligent faculty, which we call instinct, did not in the case of the ancestors of the vertebrates throw the embryo feelings on the evolutionary scrap-heap. Their instinctive form of intelligence preferred a more adventurous development. Their members chose, no doubt by suitable mating, a longer and higher path. Natural selection operated more variously for the vertebrates in their chosen homes, whether they were in the water or in the air, than for the lesser world. Whereas among the collectivist insect groups all sentimental weaklings were slaughtered by the joint efforts of nature and the clever leaders of the community, among the ancestors of the mammals the early instincts learned to cherish family ties and preferred to fight nature for their maintenance and survival in small affectionate groups rather than by a species of orphan asylums.

According to this theory, still a mere hypothesis, there is no emergence of either intelligence or feeling. Both were always there in embryo. Assuming the stronger element to be intelligence, the intelligent instinct among insects chose in effect to go on alone and to found communities on a basis of co-operation of interests, retaining only traces of affection so small that, although they may well exist, they undoubtedly appear to us fragmentary or non-existent. In such a process there is always a large element of chance, but choice is the operative factor. The agent of choice was the instinctive intelligence.

Among the vertebrate-mammal group the co-ordinate growth of intelligence and sensibility go on together by choice and not by outside compulsion. If emergence there were, it was an emergence of thousands together and the kinder and the cleverer individuals grew up side by side. A little weakness was tolerated and helped for the sake of beauty perhaps, or for the talent of sympathy or for mere family resemblance and for *Auld lang syne*. The greater weaknesses died naturally out in the cold.

Finally the progressive instinctive faculty, which is always the operative agent, unless we believe that it was itself being pushed along by something at present unknown to us, seems to have chosen adventurously to seek surroundings where further differentiation of capacity became necessary. It elected to divide itself and its house. The instinct continued to use its old quarters with the familiar group of organs in the thalamic region as before, where most of the senses converged, where sensibility was concentrated, where perhaps greater secrecy was possible and greater reserve could be maintained. The regions of the optic thalamus and the mid-brain began to be differentiated for special purposes. To a refined organ of sensation, perception and cognition were delegated all the more important elements of knowledge. Finally, there appeared embryo mental operations in the human sense, expanding consciousness, specialization of the senses and reason. Moreover, with the advent of greater need of refinement in sensibility, separate paths for strong and weak, more energetic and more delicate sensations came into development and use with their own differentiated organs.

In the growing brain there is clearly evidence in man of a controlling instinctive intelligence, which has delegated to a higher centre some of the functions of specialized intelligence, particularly with regard to optical perception. The long series of immensely slow steps have left their traces buried in the phylogenetic history of the cerebral organization and the necessary inferences can be drawn from the present state of advance, as found in man. I leave them to the experts for the past and to anyone's speculative imagination for the future. It is not necessary to suppose that we are in a state of arrest.

If I may be permitted to resume my questions, there remains to be asked the most important of all. It can be put in various ways to cover sections of a complicated subject, of which I will advance only three with provisional answers:

(1) What are the physical organs of the instinctive faculty?

(2) In what present condition, from the evolutionary point of view, are they to be found in man?

(3) What relations have the instinctive group of organs to the system of human sensibility?

The reply to the first can be only scantily foreshadowed here, as the enormous range of facts will be treated, as well as may be, in Chapters X, XVII, XVIII, and XIX. As to the second, the state of our anatomical knowledge is not sufficiently advanced to enable me to give a definite reply. I venture to express an opinion that the organs in which the human instinctive faculty operates show no sign of decay, but one or two symptoms of a recent phylogenetic advance are possibly traceable in them. It is quite a different and difficult question to determine whether a further increase in the relative power of instinct at the expense of the intellect and the intuitive faculty is or would be of ultimate benefit to the human race.

Lastly, the relation of the complete sensory system to the organs of instinct raises the most complicated part of the problem which I have set out to solve in the present work. In effect nearly the whole of the ordinary human sense and sensibility impulses receive their primary treatment in the thalamic region. From there a large part is relayed to the cortex. In what proportion this division of impulses is made and by what agency it is carried out constitute the exceedingly complex and apparently unsolvable elements of mystery, which are most inadequately treated in my later Chapter XVIII.

Let us turn for a moment to the organs serving the centres of instinctive activity, in order to ascertain the full burden of work which can be traced to those responsible regions. Sir John Parsons, writing of the later stages of organic development, chiefly in the later mammals and man, states that the 'mid-brain and optic thalamus form together the chief correlation centre for cutaneous sensory, gravistatic and photostatic impulses; and the optic thalamus is the supreme centre for dyscritic and instinctive reactions . . . they are the chief central organs of the nervous system subserving perception'.[1]

Now these organs are both groups of lesser constituent bodies with minute discriminating functions. They are situated at the base of the upper brain and have through various nuclei and subdivisions intimate connection in man by nervous fibres, some leading up and others coming down, with all parts of the cortex or grey matter of the cerebral hemispheres. It is in the latter organs that the intellectual qualities of the human brain are admittedly held to reside and neural changes in the cerebral cortex almost certainly accompany all important mental operations.

From Sir John's remarks we note that the sensory fibres from the skin, from the balancing muscles, from certain sight adjustments, as well as others, come to a thalamic centre for correlation. In the same region, though not at the same point, as we shall see later, arrive the messages from the special senses, except smell. But this is far from being all the work done. There is in man, as a sensitive and perceptive creature, a tremendous concentration of primary sensation within the thalamic region, some of which is separated up and sent on to the higher centre and some presumably obtains final treatment. All this heterogeneous mass of semi-mental material, required for simple and refined sensation and perception, is handled in the confined locality which is on high authority known to be an originating centre for instinctive reactions.

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[1] *Perception*, p. 94.

The result of Sir John's researches tends particularly to determine the paths of two forms of sensation: (1) primitive and dyscritic or protopathic sensation; (2) more highly developed epicritic sensation.

The first group of these primary sensations pass chiefly to the thalamus and are dealt with there as an end-organ. In other words, primitive sensations, most of those which are generally termed feelings, terminate and are complete in the thalamic nuclei and elsewhere than what is usually denominated the brain. Other sensations of a primitive character, devoted to crude perception, appear and probably are arrested in the same locality. All these simple impulses, constituting the appropriate food for the instinctive intelligence, presumably complete their course in what is in all probability the formal seat of the instinctive faculty.

The second group of more carefully discriminated sensations, technically called epicritic, nearly all arrive at the thalamic centre, whether they are destined ultimately to become material for perception, advanced feeling or thought. It is certain that the higher class of sensory impulses, called on this account epicritic, are relayed to the cortex of the cerebral hemispheres. What is not yet known is whether its elements undergo any influence in the thalamic centre during the course of their passage, or whether any selection may be made among the mass of indifferent material, before or during the process of being relayed to the higher destination.

It is doubtful whether some power of choice is exercised in the thalamic centre. Some sensations may there be picked over as fit subject-matter, either for the instinctive, the intellectual or intuitive faculties respectively. Alternatively it may be the case that every impulse before appearing in the various nuclei of the thalamus is already predestined for lower, middle or higher treatment at the points where each of them makes its first attack on the sensory system. The difficulties that lie in the way of the latter easy generalization are discussed later in Chapters XVIII and XIX.

The first discoverer to call attention to the rival protopathic and epicritic systems of sensation was Sir Henry Head,[1] working in conjunction with the late Dr. Rivers and with Drs. Gordon Holmes, Riddoch and Thompson. The experiments by which the two systems came to be first discriminated were elaborate and minute, but probably not decisive in proving so difficult a special point, until they were confirmed by the later researches of Sir John Parsons in comparative anatomy. He has called in phylogenetic history to confirm by comparative research an integral part of what is probably the greatest physiological-psychological discovery of modern times. The logical consequences of all these discoveries together will be dealt with at greater length in later chapters.[1]

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[1] *Studies in Neurology* (1920).

It is important to note that not only the sensory part but also the reacting part of instinctive activities are referred to the basal ganglia of the brain. The control by the thalamic organs over instinctive activities has not yet been so well studied as the side of sensation, but we know that all voluntary motor messages have to pass first through the cortex.[2] Impulses originating in the thalamus end-organ are possibly of an emotional character. In this connection of very great significance is the conjecture that a closely related organ to the thalamus, called the hypothalamus, is probably a 'highly important centre subserving the emotional accompaniments of instinctive activities'.[3]

The weight to be attached to the independent activities of the lower cranial centres in man is mainly a matter of inference from anatomy from general cases of injury by disease in the basal ganglia, especially from a few exceptional injuries before and during the War, and from internal and external observations of human behaviour. The valuable and crucial experiments on the subject of sensation, carried out by Head on himself, have been repeated by other students but not, so far as I know, so well analysed as by Head and Rivers. Numerous experiments on highly developed animals, equipped with cerebral grey matter similar to ours, can be found in the textbooks to prove that a very considerable degree of independence exists in the thalamic centres for all affective reactions and in many cases for motor initiative.

For two reasons, however, I do not wish to press any inferences that may be obtained from the analogies presented in the latter class of testimony. Some of the older experiments on animals, for example, have been carried out without exact observation of all the parts of the cranial organs removed, as they were in many cases conducted in ignorance of the vast separate importance of the numerous nuclei of the thalamus, corpus striatum and contiguous bodies. Secondly, I do not accept the parallels of dog or monkey behaviour, as throwing much light on human mental processes.

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[1] See especially the note at the end of this chapter.

[2] See diagram in Fig. I.

[3] Parsons, *Perception*, p. 121.

In man, moreover, special difficulties arise as to the existence of anything like total independence of the minor cranial centres from cortical control, owing to the undoubted intimacy which prevails between the thalamic centre and the cerebral convolutions. We can draw reasonably certain inferences on one or two crucial points from the known organs; such as that the thalamus is an end-organ for some sensations and that the cerebral cortex is similarly the end-organ for others; but thalamo-cortical fibres can convey questions to the upper brain and the cerebral cortex can send back advice besides information or, for aught we know, orders by cortico-thalamic fibres to the lower centre. There is at present a very natural tendency, even in Head's relation of the facts, to over-estimate the power of the cortical centre.[1] On the other hand, the inhibitory power of the instinct over the intellect, which is apparent to us both by introspection and by observation of behaviour, is not sufficiently taken into consideration, to my mind, by physiological investigators.

Possibly this digression on anatomical details may seem tedious and a long way from solving the problems of instinctive behaviour and the instinct-faculty. The digression probably seems too long, not because it is so long, but because it is too short. The real weight of the evidence cannot be briefly indicated. It tends to confirm an opinion now gaining ground among psychologists, that an independent organ for sensibility and perhaps emotion exists in the optic thalamus, diffusing a general balance and healthy rigidity in sensation-feeling that is commonly known as the feeling-tone of the body.

The weight of the physiological evidence tends also to establish, in my opinion, that in the end-organ of the thalamus we have an independent cognitive centre, closely associated with emotional effects. We know for a fact that a certain tendency must lie that way, owing to the circumstance that the receiving station for all sensation lies in the same region. We do not yet know all that this relation of proximity may imply.

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[1] Owing to the neglect of the thalamic centre all controlling action was ascribed to the cortical centre as a matter of course. In disease and especially cerebral disease there was ample evidence that interference with motor activities was an early symptom. This was especially emphasized by Hughlings-Jackson, who in his teaching laid stress on *release phenomena* as indicating loss of cortical control. I have no desire to minimize the great weight of evidence on this side, but I believe that not enough opening was left for the possibility of other agencies.

The thalamic region has also particularly to act as the immediate recipient of the first-hand information given by the special senses of sight, hearing, touch and taste, besides an immense variety of cutaneous and muscular messages. It is only the sense of smell that seems to go first to the cortex, without being previously relayed from the central exchange in the thalamic group.

In all reasonable probability the optic thalamus, whose functions extend far beyond the supervision of the complex optical and eye-adjusting sensations, is the seat of the instinctive faculty. It is an end-organ in its central part, the small medial nucleus with three minute subdivisions. (Three small divisions, that is to say, in each medial nucleus of each half of the thalamus, which like the cerebrum is a duplicate organ.) It is conscious for sensations of pain and for all deep mass-feelings, called originally protopathic by Head and Rivers. It is probably conscious for similarly simple cognitive states.

The so-called old thalamus is very old in phylogenetic development. Certainly parts of the whole thalamus and possibly all its present subdivisions in man, such as the anterior, posterior, medial, ventral and lateral nuclei and closely contiguous bodies, precede the creation and differentiation of the cerebral cortex of the two hemispheres. Before the appearance of the complete brain, for instance in the animals only half-way up the evolutionary ladder, such as the big and little lizards, the thalamus probably contained all of feeling and intelligence that the creatures possessed. Who can tell that even in man the cerebral cortex may not be the servant and seldom the master? Perhaps man himself since the time of the Greeks has been mistaken in supposing that the lobes of the upper brain have obtained complete independence.

If we return to the psychological processes of self-inspection and introspection, we may accept the conclusion that there is a definite human instinctive faculty which has an overriding power over instinctive behaviour. It develops instinctive activities and carries them, so to speak, to a higher power in advanced social and economic instincts. It chooses between the unit-instincts, setting one against the other, combining and modifying them into advanced instincts with the help of cortical influence. The faculty uses its final prerogative or instinctive right to appeal to and employ the specialized activities and reserves of acquired knowledge in the realm of reason. Whether it has any direct command over the faculty of intuition is very much more a matter of doubt.

Reversing the process of inference, we may say that we know that there is a definite seat in our organs of intelligence for an instinctive faculty. We cannot put the certainty so high as we may and have long done in the case of the intellectual relations of the cerebral cortex. But the inference is of the same order of evidence. Similarly we can tell with a reasonable amount of accuracy where the location of instinct will be found.

Nothing that we can learn about the bodily location of instinct and of its facilities for communicating both ways with the known organ of reason will controvert the view expressed above of the primary right and privilege and power of the faculty of instinct to call for help from and set in motion the superior resources of the intellect. Such a power almost carries with it the equal capacity to disuse the intellect and probably also with less certainty to inhibit its working during moments of stress and in preparation for violent or sudden action.

Are we not also frequently aware that a basic counter-instinct tends sometimes to turn us away from reason? Perhaps it would be more accurate to say that, while we instinctively appeal to our reason from time to time in states of perplexity, at others we obey at short notice and less justifiably an instinct of a lower order, a self-sufficient instinct, deciding peremptorily that the higher brain is to be distrusted? It is almost as if there were in us an alternate appeal to reason and a wanton rejection of its aid.

NOTE I

It would be well to indicate here the two *separate* lines of argument from the physiology of the brain, on which I rely in the text. They are very important in themselves, and it is equally important here to keep them separate. The serious reader should follow them up for himself in the original books.

The *main* argument will be found in *Studies in Neurology* (1920), by Sir Henry Head and his colleagues. It is contained in two separate sets of investigations which are not to be confused. The *first* relate to the special relations between the mesial or medial nucleus of the optic thalamus and the cortex of the cerebral hemispheres. They were studied on the basis of several rare cases of thalamic injury from the War, which threw a flood of light on the peculiar relations indicated between the cerebral and thalamic regions. They will be discussed in Chapters X, XVII and XIX. In Chapter XVIII is discussed the wholly separate problem of differentiated sensation, which constitutes the *second* (although earlier in point of time) and what many would consider the more important group of investigations contained in some experiments on himself, carried out by Head, mainly with the assistance of Rivers.

The *supplementary* part of both investigations will be found in the wonderful argument developed from comparative anatomy by Sir John Parsons in his *Introduction to the Theory of Perception* (1927). Parsons herein establishes two lines of reasoning. In the *first* place he discusses what I consider to be Head's *second* and lesser point. He confirms and amplifies the theory of duality in sensibility, which was first elaborated by Head and Rivers. This duality of feeling is not identical with the more important theory of mental duality, which is discussed in general in Part II of the present work, although it proves in the end to have very close relations with it.

In the *second* place Parsons returns to what I hold to be Head's *first* and more important point. Sir John exposes, for the purposes of his own admirable hypothesis with regard to perception and perceptual patterns, a complete phylogenetic history of the growth of the thalamic and allied cranial organs within the line of development of vertebrates and mammals. The illustrations accompanying this convincing argument, particularly his own diagrams, showing the sensory paths to the tectum (see especially pp. 81 and 83), the geniculate bodies and the optic thalamus with their cortical projections, are quite irreplaceable and indispensable in any attempt to follow the full logical force of his contentions. I have not been able in my text to do more than indicate the minute strands of implication which lie in the paths described, running hither and thither with far greater complications than one can find in a telephone exchange. To think that the greatest storms in the world occur in a cubic content rather smaller than that of a teacup!

NOTE II

New light of great importance has been thrown recently on the acquired but not altogether fixed relations between neurons, originally independent, changes which have been superinduced by external impulses and later form paths of stereotyped neural activity. There are thus formed self-contained minor motor systems called 'conditional reflexes'. conditioned The researches of Professor Pavlov, published between 1903 and 1928, constitute on this subject a monumental fabric of ascertained results.

I am only concerned with a rather hasty interpretation of the fundamental nature of this linkage of neural conditions, which is said to extend its influence in homogeneous fashion throughout the brain as a whole under the same conditions as throughout the body. If this view be correct, it would amount very nearly to a restatement of the Associationist Theory of Ideas in a physiological form.

I do not believe that such a unitary uniformity exists throughout our mental system. I believe that there will always remain a fundamental distinction between motor innervations actuated on local initiative and motor activities dependent on central innervation and subject to what is usually called 'cortical control'.

CHAPTER V

INTUITION

In passing from the consideration of Instinct to that of Intuition there is an imaginative change from something concrete to something abstract. Compared as mental facts instinct has a close hold on life and its necessities, while intuition will lead us far from actuality into regions where we may hesitate to trust its guidance. A physiologist may go very deeply into the influence of instinct on our mental constitution and not think it worth while to print the word, intuition, in his pages. Even to the most serious students the latter will seem an optional subject for reflection, while the former cannot be overlooked.

In my particular point of view the difference of outlook in following the two studies and in bringing them together for contrast and comparison, is best expressed by saying that instinct must be considered on very good scientific authority to be anchored to a definite set of physical organs, while intuition may be referred anywhere, if it is not some kind of cerebral operation. It is difficult to find for our researches on intuition the support of any physiological data whatever. Although we may appeal to authority in matters of definition and comment, it is authority of a very different kind from what was freely available in almost too great a profusion with regard to instinct.

The authority that can be cited for very varying views with regard to intuition is that of philosophers of the old and new school and that of some psychologists, whose opinions are tinctured with a strong dose of opposition to metaphysical doctrines of all kinds. I confess that I am much more guided in my own speculations by the psychologists, and among the philosophers I have less inclination to rely on those who have founded their whole philosophy on intuition, than on others like Spinoza, who have regarded intuition as only one of the methods of true knowledge.

Although they are a little irregular and unphilosophical in their expression, let me begin by citing the views of a modern thinker, for whose practical knowledge and unusual powers of insight I have always the profoundest respect. Dr. Jung in his *Psychological Types* writes that intuition is one of four basic psychological functions and transmits perceptions in an unconscious way. It is neither sensation, he says, nor feeling nor intellectual conclusion, though it may appear in any one of these forms. It is a kind of instinctive apprehension, irrespective of the nature of its contents. Its contents are given. They have an intrinsic character of certainty. Any one content is presented by intuition, as a complete whole, without our being able to discover or explain in what way it was arrived at. Like sensation, it is an irrational perceptive function. Intuition, he considers, may be subjective or objective; it may have abstract and concrete forms.

Perhaps I should explain that in Dr. Jung's view the term, function, means a 'psychic activity, which remains theoretically the same under varying circumstances'. He names only four functions, that are basic and fundamental, and divides them in two groups. Feeling and thought [1] are to him rational functions. Sensation and intuition are irrational functions.

As sensation is to feeling, so intuition acts to thought, in presenting it with material. But while sensation has a definite physical basis and acts mostly in full consciousness, intuition grasps the material extra-consciously and presents it to thought as a complete whole, the details of which are not matters of discussion.

Although this form of definition is new and may not fit in very well with those more rarefied ideas, where all wholes are analysed and reduced as far as possible to parts, it does go some way to meet the more modern notions that nearly everything which comes into consciousness does not appear in small fragments to be put together by mental effort in consciousness, but presents itself always as some kind of whole or according to some preconceived pattern. If thus we see a table or realize the presence of a person or recognize a tune, before we see or perceive separate legs or features or hear many notes, so the ideas of a good man or a good government or of goodness itself are separately presented as full-blown realities in their classes or categories, as contrasted with bad men, arbitrary governments or intrinsic weakness and not as compared with blue monkeys, with dark railway stations or with a loud noise.

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[1] Since Jung's definition of thought is important, particularly in showing that perception in intuition becomes presentation as applied to thinking, I had better repeat it. 'Thinking is one of the four basic psychological functions. It is that psychological function which, in accordance with its own laws, brings given presentations (cf. perceptions in the definition of intuition) into conceptual connection. It is an apperceptive activity—both active and passive. Active thinking is an act of will, passive thinking an occurrence.' What is described by the older psychologists as associative thinking Jung would consider to be a certain continuity in presentation. The faculty of directed thinking is intellect; the faculty of passive thinking is intuition. The latter is largely unconscious, but may be subsequently recognized in consciousness as giving results which correspond with reason.

The presentation of a good man includes other men with parallel qualities and not irrelevant dissimilarities. Vast quantities of doubtful parodies of good men are shut off, such as a virtuous bookmaker, an industrious convict or a Liberal President of the Board of Trade. The presentation of a good government may include to an educated man instantaneous comparisons between the senates of Rome and Venice or the rule of Pericles, but not the organization of the Civil Service Supply Association. So also the presentation of 'goodness' shuts out automatically, first of all, all things that are not abstract qualities, secondly, material qualities that might be taken as abstract, such as squareness or being made of sound wood, and lastly, occasional qualities of meritorious character, such as always being in time for appointments.

This automatic, extra-conscious, eliminating work of the mind is not performed by anything like an instantaneous review of every possible negative but by the application of a pattern or excluding idea carried in the memory and applied unconsciously. The same amount of selective work done by conscious processes would be stupendous. I believe Jung's suggestion to be that the function of perceptive intuition is certainly the process of pattern-application and possibly in many cases a little further fashioning of the presented pattern before complete presentation. The extra-conscious mental work of intuition, after being negative, will add to and improve the pattern in some such way as the following.

The idea of a good man may come before any of us with some resemblance to the career of St. Francis, or of Lord Lister, or in the attire of a doctor round the corner, or with the face of some dead and half-forgotten friend. Every virtue we recognize in life will improve our idea of the good man. So also all abstract notions will be worked up and improved in a way that we may fail to identify as being our own, because the material of certain definite patterns has been subtly changed without our having the key to open the mystery of the alteration. The mental process has taken place outside our consciousness.

Suppose, for instance, that I have been reading the life of the English king, Henry II, and a week later it occurs to me, after some annoyance in business, that the murder of Thomas à Becket was not such a crime as it appeared to be on the last occasion when I had thought about it. The change in the later judgment would be due to a new presentation. Intuition had no doubt been at work, at the prompting perhaps of instinctive irritation, altering my views of abstract justice in an unconscious manner, of which I had totally lost the connection.

If the above is not a misrepresentation of Dr. Jung's basic idea of intuition, I think no better description could be given than his of an extra-conscious mental process, of which we are from time to time dimly aware. It errs perhaps on the side of incompleteness, but that is fatally frequent and sometimes an unavoidable feature of definitions. Also some people might infer that 'irrational'[1] was hardly justified as an epithet of intuition. I am not sure that I altogether defend it, but I believe I understand why the epithet might be used in that connection.

Perhaps I should prefer to say that the faculty may be called irrational, because we cannot count on its always acting in the way we consider rational. On the other hand, it is not necessarily the case that it always acts irrationally according to our notions. There is good authority for believing that the promptings of intuition ought to be subject to the judgments of the reason in consciousness. As a limited justification for calling intuition irrational, I propose to make a further reference to the above illustration of the death of Thomas à Becket.

Suppose that on November 10, last month, I judged the crime as an historical event and reprobated especially the impatience of the king, holding him morally guilty of the crime; suppose that on November 15 I was intensely angry with my secretary for something he had done, while I was away from the office; suppose that on November 20 I made a mental comparison of myself with Henry II without knowing it, then on or after the later date I should naturally take a more lenient view of the king's hasty remark about a turbulent priest.

It is, of course, quite possible that I am putting a gloss on Jung's views, in which case I must take the responsibility for it myself. The problem of perceptive intuition not only offers us a good example of the elementary action of the mind during its performance of necessary but extra-conscious and unthanked work for its master, but it leads us much further. I believe that the extra-conscious work of the mind, that is to say, of the intuitive faculty generally, extends beyond mere acts of presentation. It is even possible and may appear later, that presentations are not the most typical examples of that kind of extra-conscious thinking, which is of the essence of intuition.

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[1] The word 'irrational' can be used in two senses: as without the ordinary processes of reasoning, or, as contrary to the usual processes of reasoning. Intuition is only irrational in the first of these two senses.

Let us argue upon the view that intuition is for the most part extra-conscious thinking and, presumably, thinking which takes place in the cortical grey matter of the cerebral hemispheres, unless and until there is, first, some suggestion and, secondly, some proof that man has a special organ somewhere for intuitional thinking, as he certainly may have, and probably really has, in the lower brain for the operation of his instinctive intelligence. Starting from Jung's suggestion that intuition is concerned with extra-conscious presentation, or, as he calls it sometimes, perception, its chief, if not only, field of exercise precedes that of thought. This fact is not quite clear from Jung's definition and I need not therefore insist on it further than to say that I cannot accept the limitation at all. I am convinced that intuition, as an intellectual function, is not only concerned with original presentation of perceptions, but that it is continually penetrating conscious thought and being modified by it, so that it is difficult to say in many cases where intuition begins or where it ends.

Consider for a moment how difficult it would be to maintain the contrary. The finished thought or judgment of to-day relapses into the memory and in re-emerging into the actual consciousness of to-morrow will become a fresh presentation subject to internal extra-conscious modification, as in the suggested instance given above of the representation in consciousness of my double judgment on the murder of Thomas à Becket. Similarly since events of memory are fresh mental facts, when they reappear and become subject to conscious manipulation and criticism, the everyday intellect has also a fair chance of holding its own with every fresh appearance and can modify the latter before it is sent back to be stored again in the traces of memory. Action and reaction of reason and intuition are inevitable and undeniable, unless the ground is taken that intuition is no more than a fancy term, representing nothing tangible, practical or comprehensible.

At this point we return to firmer ground. It is the reappearance of changed ideas and images, which affords the strongest proof of the reality of intuition. Consequently my view of intuition, contrary to what I understand to be Dr. Jung's view, is that intuition, as we know it and as in fact it has always been described in philosophy, consists essentially of two forms. The first form is simple intuition or the perception of elementary truths of the kind which have been frequently called self-evident. The second is not so easy to put into accurate form. It is doubtful in any particular case how far it is pure and unmixed intuition and how much it may be imbued with conscious reasoning. It is an intuition founded on experience, using the materials prepared by experience and judging the truth or otherwise of the results of experience.

In both forms of intuition there is a spontaneous recognition of truth, or the amount of truth including the proportion of error, in any serious proposition. No one would contend, I suppose, that the recognition of truth is absolute and extending to the boundaries of all knowledge. The recognition of truth must therefore have limitations, which can only be roughly defined. There must be some relation between the capacity of the individual brain and the form of truth, which is expressed in the judgment. Language, material information and the contents of the memory storehouse [1] are contributing factors. There seems, however, to be general agreement among all who have attempted to form a serious opinion about it that what we may call the range of the intuitive faculty tends to exceed that of any conscious reasonable effort in any individual. It may be due to reserves of personal intellectual strength, it may be attributable to a certain logical honesty in all of us, or it may be owing to greater independence of instinctive influences, or of all these circumstances together, that most of us receive the impression that intuition serves out to all of us ultimately, or can do so, some kind of iron ration of truth in case of need. Such assistance appears to be available equally in the simplest questions and in the most complicated perplexities.

It was formerly held that the single and easy problems of life were the more important. There seem to be fewer easy problems than there used to be. The intuition of a simple proposition, such as the coexistence of a few numbers, three, four, or five together as an aggregate, and not as an addition of separate units, is taken to be in a small class by itself as a mental event. Its like is rare and pertains only to the beginning of the sciences.[1] Almost the simplest forms of perception, notably those which implicitly construct the idea of space, are now known to be as much the work of experience and memory as they are of visual and tactile impressions. Simple and perceptual intuition are therefore not easy to distinguish nor to define. The terms almost inevitably include a certain amount of experience.

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[1] It must be borne in mind that the hidden contents of memory at the command of intuition vastly exceed those which are at the disposal of consciousness. See Chapter XIII on Memory.

Advanced intuition includes perception of complex objects and complex abstract propositions as a whole. Here naturally the ordinary work of the conscious intellect or reason has been already at work on the material presented. On the one hand, it is generally recognized that rational deduction and rational judgment give right or wrong decisions slowly by their own open processes, which can be criticized at every stage of their advance. On the other hand, judgments and estimates by intuition, giving results with perhaps no very different proportion of right and wrong character as reason, but more rapidly, are well known to be mental processes, which have to be reckoned with.

These at times resemble clever guessing, but they are unquestionably something more. In fact some very important ideas have in the end to be ultimately referred to the tribunal of intuition. Although on matters of great moral moment there is generally to be found a sanction from authority and a support from the general consensus of opinion as to the rightness of certain views, yet the ultimate judge of all so-called self-evident truths remains our own intuition.

Intuition whether simple or advanced is not to be set up as an opponent of or rival to reason. This has been well expressed by two very able writers. Signor Ruggiero writes, criticizing what he considers to be exaggerated over-estimates of the value of intuition: 'That kind of thought, implied in X——'s description of Intuition, has an immediacy and unreflectiveness which, far from being signs of superiority, are on the contrary signs of its very inferiority. . . . All forms of science remain outside the reality wherein X—— is confined.'[2] The same idea is indicated by Dr. G. E. Moore with a more favourable inclination towards the generally acknowledged claims of intuition: 'We must not therefore look on intuition as if it were an alternative to reasoning. . . . Intuition can only furnish a reason for holding any proposition to be true: this, however, it must do when any proposition is self-evident, when, in fact, there are no reasons to prove its truth.'[1]

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[1] What Professor Blondel calls 'Intuition sensible'. See *L'Action*, pp. 45, 46, 101.

[2] *Modern Philosophers*, p. 180.

The real difficulty about intuition has always been to determine whether there are in fact two forms of it, so utterly distinct, that, as Kant held, man can only exercise the simple form of it, while the other is reserved to God alone, or whether simple and advanced intuition are really but one faculty, split apart into two varieties by contact with some powerful but sympathetic influence, such as the reason itself working in full consciousness.

For the latter view there is good authority in the great philosophical innovator, Descartes, who, as his able biographer and commentator, Professor Chevalier, has said,[2] was the first clearly to define the meaning and function of intuition. The mental faculty of intuition, occupying the basis of Descartes' theory, is perhaps most clearly shown in his letter to the Marquis of Newcastle, where he discusses the nature of intuitive knowledge. While intuition is responsible for the immediate recognition of such an elementary proposition as 'je pense, donc je suis', it has also to interpret the complex evidence of the senses. This evidence of the senses Descartes confesses to be 'a little obscured by its mixture with the influence of the body'.

In this sentence Descartes puts his finger on the whole difficulty in interpreting the nature of the faculty of intuition. Whether the rational man wills it or not, he has often to refer both primary and final difficulties to the faculty of intuition. He has recourse to it both first and last. In between the two extremes he works away as well as he can with his faculty of reason. Is it a matter of surprise that in practice he cannot always be aware, whether he is in any case of distorted evidence depending on reason only or inadvertently appealing to his own intuition?

~~One or two more~~ references to philosophical writers will illustrate the ~~striking~~ difference between the conditions of the exhibition~~, or I~~ may almost ~~say of the~~ deliverance, of intuition both in its simple and in its advanced forms. Professor H. Wildon Carr deals with primary or immediate intuition, by far the most intricate to define, although not the most difficult to understand. 'Intuition is the apprehension by the mind of reality directly as it is and not under the form of a perception or a conception, nor as an idea or object of the reason, all of which by contrast are intellectual apprehension.'[3]

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[1] *Principia Ethica*, p. 144.

[2] *Vie de Descartes*, p. 189.

[3] *Philosophy of Change*, p. 21.

In its simple form intuition has the support of most modern philosophers, notably Spinoza, and even of some utilitarians, such as Henry Sidgwick, who relies on it for his doctrine of pleasure. But simple intuition is apt to be stretched out and applied to cases of great complication, where in reality it is no longer the simple or immediate form of the faculty of intuition which is in operation. How then can we apply an elemental form whose characteristics are certainty and immediacy to very advanced problems? It cannot be done. For intricate work we must look for an advanced form of intuition.

The possibility of any solution of advanced problems by intuition lies in the fact that, before being submitted or left to intuition at all, they have been already considered and worked over in consciousness by the ordinary reason. This is a necessary process, before they pass, so to speak, into the charge of the faculty of intuition, before in fact the secret and inward appeal has been privately, even unconsciously, made from the distressed and embarrassed faculty of reason to a higher power. This side of intuition, unquestionably the greater side, was first realized and described by Descartes and it is to the biographer of Descartes, M. Chevalier, that I shall turn for a brilliant exposition of the difficulty and for suitable criticism of some of the shortcomings of the great philosopher's explanation.

'L'intuition n'est que l'acte propre de l'intelligence, prise à son point le plus haut et dans son épanouissement suprême, puisque l'intelligence complète, c'est la faculté de pénétrer à l'intérieur de son objet pour le lire, c'est le pouvoir de contempler du dedans. Pour en préciser les caractères, il suffit de s'adresser aux génies qui ont éprouvé l'intuition et nous l'ont décrite: un Henri Poincaré en science, un Napoléon en art militaire, un Michel-Ange on un César Franck en art pur, une sainte Thérèse en matière religieuse. Chez tous, l'intuition rationelle apparaît avec un caractère double, qui suffit à la définir: c'est une connaissance immédiate et c'est une connaissance réelle.' [1]

M. Chevalier adds that it is characteristic of the operation of intuition of this nature—intuition in the form which I should describe as advanced—that its 'case' or the 'full complement of facts from experience which have to be submitted to it' has to be prepared long beforehand. Another feature of the revelation of intuition is the sudden completeness of its decision and presentation. 'Elle éclate tout d'un coup, en une soudaine illumination.'

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[1] *Vie de Descartes*, pp. 190 and 192.

Besides a number of classical instances which are on record,[1] it is a matter of common experience to which almost every one can lay claim, that separate intuitions coming immediately after profound sleep bring with them the special excitement to which M. Chevalier refers. The mental situation seems to me very much related to the phenomenon of 'belief', as particularly studied by William James. The sense of conviction arises from the appropriateness afforded by the new thought to some old problem. It constitutes a peculiar enlightenment in what each individual knows to be a specially dark corner for himself. What is most surprising about the fresh idea is its complete relevance to the old difficulty.

There are many cases of sudden revelation which partake of both spiritual and intellectual enlightenment, where it would be difficult to say whether the affective or rational element predominated. Such, for instance, are the vision of St. Paul near Damascus and the allied inward monitor which told Luther that 'the just shall live by faith'. In both these cases it is possible that the instinctive faculty may have had more influence on the result than any mental operation which can properly be called intuitive. A very good argument could be made out for supporting the view that the two influences were here allied.

In the case of Descartes' dream of November 10, 1619, near the environs of Ulm, after a period of long meditation and intellectual striving, during which, as he said himself, he had not tasted wine for three months, there is very much less room for doubt. His revelation came to him with some religious accompaniments, such as his intention to visit his old chapel in the Jesuit School at La Flèche, but the matter was wholly intellectual. There were presented to him, coming as an enquirer after truth, a Dictionary, representing knowledge, and the volume of the Corpus Poetarum, which he took to be the symbol of inspiration.[2]

The effect of the revelation on Descartes was to provide him with a foundation for his whole philosophy, not resting too much on unco-ordinated observation but on that species of inward vision whereby knowledge becomes unified, to which he gave the term, 'intuition,' already designated by the schoolmen as *cognitio intuitiva*. To intuition he gave an expanded interpretation, covering both sides of its character.

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[1] See note at end of present chapter.

[2] Chevalier, *Vie de Descartes*, pp. 40–7. See also Chapter XV on Dreams.

The first simple form runs as follows: 'Per intuitum intelligo, non fluctuantem sensuum fidem, vel malae componentis imaginationis judicium fallax, sed mentis purae et attentae tam facilem distinctumque conceptum, ut de eo, quod intelligimus, nulla prorsus dubitatio relinquatur. . . .'[1]

Some years later he added a more poetical version of the intuition form of knowledge in his letter to the Marquis of Newcastle:[2] 'Cette connaissance n'est point un ouvrage de votre raisonnement, ni une instruction que vos maîtres vous aient donnée; votre esprit la voit, la sent et la manie; et quoique votre imagination, qui se mêle importunément dans vos pensées, en diminue la clarté, la voulant revêtir de ses figures, elle vous est pourtant une preuve de la capacité de vos âmes à recevoir de Dieu une connaissance intuitive.'

It is sufficiently clear from this passage that Descartes contemplates the confused aspect of intuition, that arises from criticism of intuitive propositions by the reason. He vindicates the superior quality of the primary unmingled form and asserts that it can always be disentangled from all that overlays it in the mind. It is a good description of what we now call immediate intuition, with special application to his own maxim: *Cogito ergo sum.*

M. Chevalier, although many people might hold that he was an admirer not always sufficiently critical of the intuitive method of knowledge, if we may so call an intellectual leaning in that direction, does not fail to point out two limitations[3] to the over-sanguine reliance on intuition of Descartes and his followers. They bear on the inward certainty, which is a peculiar feature of intuition, whether in its simple or advanced forms.

M. Chevalier first raises the question whether veritable intuition, which delivers to us simple principles conceived as absolutely certain, is a faculty which man can hope to obtain? There is no certain intellectual standard, mathematical or other, whereby its secure identity can be recognized. Both forms of intuition, simple and advanced, are attainted by this criticism.

Not even those philosophers who have leaned most heavily on the evidence of intuition for the support of self-evident truths have quite successfully grappled with the problems of justifying or guaranteeing the necessary truth of solutions which depend nakedly on the sanction of inward certainty alone. Intuitive inward certainty is a form of confident belief founded on two principles, neither of which amounts to proof in any serious sense. Nor are they verification by any independent standard. The first is self-relevance, arising from the verisimilar solution of previously experienced and carefully examined difficulties. The second is the unexpected presentation in a complete form of well-arranged material, which has been long wanted, most of it taken from extra-conscious sources, such as hidden memory.

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[1] *Discours,* Second Part, VI, 11.

[2] *Vie de Descartes,* pp. 173, 218.

[3] *Vie de Descartes,* pp. 191–3.

In both these features the extra-conscious origin of intuitive presentations imposes belief, because only one person in a hundred is aware of any mental process, which does not occur in consciousness. Hence arises the well-known portent of intense surprise that usually accompanies illuminating intuitive conclusions. By adding to the mystery surprise tends in itself to increase the strength of conviction. But it may not in cases of disappointment add to inward intuitive certainty. In rarer moments there may be dejection at the failure of help from our secret ally, as Maurice Blondel has penetratingly said: 'Ce que nous avons à redouter, c'est en même temps l'impuissance de l'effort refoulé et la fécondité imprévue d'une intervention trop secondée. Tantôt plus, tantôt moins, et jamais ce que nous voulions.'[1]

The second criticism of Descartes' biographer touches the requirement that the faculty of intuition in its advanced capacity can only be released and set in motion after long and painful labour has already been expended by the reason. It is suggested that even with a ready acceptance of such a hypothesis, there must be uncertainty in determining the degree of previous preparation that is required in order to elicit the operation of intuition.

How long and how painful must be or should be the preparatory labour in presenting, so to speak, the intellectual case which is to be humbly and perhaps involuntarily offered to the supreme judgment of intuition? Admitting the substantial validity of the verdict when it comes, what are the critical contributing factors to its accuracy? The amount of evidence, the order and arrangement of the evidence, the length of preparation, the distress and moral suffering involved in the enquiry, are they not all in question? Some of the determining elements seem to be voluntary, while the result savours of magic. I cannot resist the conclusion that the Cartesian emphasis on the compelling authority of intuition needs some buttressing with regard to many details. So also, I may add, does the group of ideas underlying the hypothesis of valid self-evidence require some help to make them into an intelligible proposition.

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[1] *L'Action*, p. 217.

We may take it to be probable, as I am convinced is really the case, that there are two forms of intuition, both referable to what is essentially the same faculty. Such is certainly the conclusion to be drawn from the common usage of the term which is predominantly confined to the advanced form of intuition. Naturally enough the usage is rather loose, but not in substance inaccurate. It ranges on one side from the clever guessing founded on native shrewdness, often and especially attributed to women, on the other to the particular insight acquired by experts, who come after long practice to depend a good deal on extra-conscious thinking. Philosophers, on the other hand, have more usually linked the name, intuition, with the simple or immediate form, bringing it into their systems in order to provide for the elementary sensations of space-time, where its utility is still to be proved, or to furnish some kind of semi-metaphysical support for those truths which are called self-evident.

Let me give two more illustrations from authority as to the philosophic view of intuition. The earlier is from the great contemporary of Descartes, the Hebrew-Dutch philosopher, Spinoza, who, although he does not use the term, intuition, in this connection, exactly describes in his citation of the third method of knowledge what is clearly the simple form of it. The first method of knowledge is: 'perceptio ex auditu et perceptio ab experientia vaga'; the second is: 'perceptio ubi essentia rei ex alia re concluditur, sed non adaequate'; the third is: 'perceptio rei per solam suam essentiam'.[1]

The more recent view of that profound thinker, Professor Blondel of Aix, provides a golden bridge, to my mind not quite adequately, from the simple form of intuition to that which is more advanced. 'Dans l'ordre qualitatif la compétence acquise par le connaisseur n'est-elle pas une intuition laborieusement et lentement obtenue? L'intuition ne précède ou n'exclut pas toujours la réflexion discursive et la pensée analytique; elle peut aussi la suivre et la récompenser.'[2]

I hesitate very much to criticize for want of clearness, as I must do to some extent from the psychological point of view, so admirable a statement and so bold a foreshadowing of advanced intuition by a very great philosopher. While it does not seem to me to cover all the ground it might do, as I shall presently try to explain, yet the extension of the meaning of intuition, very often confined by philosophers to its immediate operation only, so as to include also close co-operation of this particular faculty with the full play of reason in consciousness, is in my humble opinion a philosophical appreciation of a faculty hitherto only half understood, that should be regarded as classical. The passage, although a little obscure owing to its brevity, certainly indicates to my mind a co-operation of a continuous character between the conscious forces of reason and the unconscious reflective powers of intuition. The work of intuition, as well as that of reason, are by their reciprocal assistance each raised to a higher power.

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[1] *De Intellectus Emendatione*, p. 7.

[2] Lalande, *Vocabulaire de la Philosophie*, p. 402.

In Blondel's statement the weighty terms are, *récompenser* and *réflexion*. The French have fewer philosophical terms than the Germans or perhaps than ourselves, but they use them more exactly and definitely. Recompense here has no meaning of moral reward or reinstatement. The word is used like 'compensation' in the sense that a watchmaker would use it of his wheels and escapement. Intuition is a faculty lying in wait within us to take the place of reason before or soon after certain incompetences of the latter are felt by the self. It may compensate a tendency or it may fill a gap. It can equally provide a revelation of what is called self-evident truth at the outset of a philosophical speculation or it can come to the rescue of Descartes after he has exhausted the concentration of effort and ingenuity of three months' reflection on a problem which he has failed to solve by his reason.

Even more important in the same context is the word, *réflexion*. The use of the word, *réfléchir*, in the past participle by Blondel and others is of great significance in their philosophical writings. 'Connaissance réfléchie' means a return of knowledge on itself, a synthesis to the second degree. 'La conscience réfléchie' is still more closely described as 'l'état de contraste maximum des représentations inconscientes'. Although the form of words, 'intuition réfléchie', is not so far as I know employed by Blondel, it would exactly define the meaning of an advanced form of intuition, as I understand it.

The work of simple, primary or immediate intuition, after having been submitted to the reflexive action of the intellect, summing up all the conscious rational capacities of the mind, and then having the result resubmitted to all the unconscious forces of the mind, would probably bring into play the advanced faculty of intuition. Both processes, simple and advanced, would imply physiologically the unconscious use of the cerebral cortex. Operations so comprehensive as these, which involve the full play and exercise of the most delicate energies and capacities of the mind, cannot be included in any definition which seems or attempts to limit them chiefly to skilled insight or to the mere fruit of expert talents. It is the wish to make the broad field open to the work of advanced intuition that makes me deprecate any suggestion that its field is narrow. Only in this respect do I find room to differ slightly from Professor Blondel.

Advanced intuition is more complicated in its operation than immediate or primary intuition, but it is equally simple in its result. It comes into consciousness with the effect of unexpected illumination, because it emerges from extra-conscious conditions into the scope and purview of a mind whose conscious side is under the inflexible impression that all its operations have been conscious. A simple mind may have experiences of this kind and simple minds may have them so often that they place in them a mistaken confidence and take easily to guessing, to reliance on 'hunches', or on superstitions. A trained mind yields to the disclosures of intuition less easily and only after greater previous effort by the reason. Where resistance to intuitive suggestion becomes frequent in a trained mind, or specially prolonged as no doubt occurred in the case of Descartes, the simplicity and suddenness of a satisfactory solution of personal problems and particularly of acute dilemmas may easily have an explosive effect.

Dr. Moore is undoubtedly right, that no intuition, however apparently conclusive in its convincing force it may appear to be, can be taken as an alternative to reason. Neither belief, nor any form of inward certainty, may seriously be accepted as a criterion of truth, although in action they may be a useful practical substitute. The same limitations must be held to apply also to any of the results of intuition. Whenever the criticism of reason, as in exposing an inward contradiction, can be held to invalidate a particular intuitive conclusion, the latter must be surrendered or regarded as under grave suspicion.

The conclusions of both intuition and of intellectual examination by the conscious reason may, and in my opinion should, whenever possible, come under the judgment of each other. In practice it very seldom occurs that intuition suffers any process of revision by the intellect. However arrived at, intuitive inferences and decisions have usually a convincing immediacy and an inspired force which tend to translate them into effective reality for the individual. On the other hand, firm logical conclusions, supported by valid arguments, or what seem to pass as such for the moment, are generally enough for the intellect which has created them. The victorious mind does not care to throw back into the recesses of its own unconsciousness any solutions which are considered satisfactory. There ensues in the majority of cases the almost inevitable result that the two great functions of the cerebral cortex are not called upon to support each other.

Two notable classes of cases are more or less willingly submitted by the mind to what many philosophers [1] have called the higher faculty of intuition. There comes a point in certain problems, common to all thinking and to many unthinking people, where reason seems to come to a full stop. Moral questions offer the greatest perplexities. Reason is then ready to surrender itself, and avowedly does so, to unaided intuition in order that answers or results may be obtained which will satisfy emotional demands and allay doubts which the intellect cannot altogether dispose of or conquer. The reply is not always reassuring.

The other class of references are more often but not always involuntary. The conscious reason has stubbornly done its utmost to solve a difficulty and failed; or it is looking about for a method of swifter achievement in the realms of ordered thought. The reference to intuition by the tired understanding is then probably anti-voluntary or involuntary. Sir William Hamilton's discovery of quaternions and the mathematical solution of a problem by M. Henri Poincaré are both cases in point. Unquestionably it is the advanced and not the simple form of the faculty of intuition which is responsible for helping the lamed intellect over a high stile. 'C'est par la logique qu'on démontre, c'est par l'intuition qu'on invente . . .' says Poincaré in *Science et Méthode*. 'La faculté qui nous apprend à voir, c'est l'intuition.' [2]

NOTE

In the *Unconscious Self*, Chapter VII, Professor Jastrow gives some interesting details of historic cases, notably a most intricate matter deciphered by an Assyriologist in a dream. Both Andrew Lang and R. L. Stevenson record similar revelations. Other conspicuous cases of inspiration, akin to intuition, are related of Coleridge in his composition of Kubla Khan; of Mozart in the writing of the Zauberflöte; of Professor Kekule in discovering the 'dance of the atoms'. The dream is a frequent vehicle of intuition.

The most conspicuous instance recently has been the mathematical solutions of Srinivasa Ramanudjan (*Life*, by G. H. Hardy, F.R.S.).

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[1] Among others, Maurice Blondel, *Vocabulaire*, p. 670.

[2] P. 137.

CHAPTER VI

SIMPLE OR IMMEDIATE INTUITION

ALTHOUGH the language seems very vague to modern ears, it is difficult to get nearer to a true definition of simple intuition than in Spinoza's description of the third method of knowledge. Descartes, in immortalizing the name, did not go so close in describing the reality. He left intuition hanging up in the air in a vague duality. The strength of Spinoza lies in the fact that he leads us to the best method of understanding a faculty, which is doubtful to some and elusive to all, by his careful enumeration of the kinds of knowledge or modes of intelligence in which intuition is not to be included. Intuition is the perception of a reality by its simple sole essence. It is not the understanding of a fact, mental or otherwise, acquired inadequately by inferences of its essential nature from its relations with other facts, which is the second method of knowledge. Nor is it the perception of a fact by report at second-hand or by the vague experience of the senses.

Taking the latter as the primary method of knowledge, we know now, even better than in Spinoza's time, how complicated and essentially indirect the series of experiences comprised in sensation and perception really are. Intuition, because it is the simplest, remains the most difficult form of knowledge. Spinoza acknowledged that it was only with regard to one or two things that he had acquired knowledge by intuition. Another way he has of phrasing the inward and direct vision of truth is: 'Tam enim res intelligitur, cum ipsa pura mente extra verba et imagines percipitur.' [1]

Any widening of the idea of intuition destroys its essential character. To define it [2] as the immediate apprehension of an object by the mind, by the intellect alone or by the senses, leaves us in doubt as to what the word 'immediate' means in this connection and what common basis of knowledge can be assigned to the senses and to the intellect.

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[1] *Van Vloten's Edition*, II, 7.

[2] *Murray's Dictionary.*

No surer basis is found for intuition in the description given in the *Grande Encyclopédie*, which adds little further help by saying that it is an act of intellectual intuition to discuss two elements in one single representation. That is probably due to the analysing power of the intellectual faculty in full consciousness, and does not seem to pertain to either primary perception nor to reflective intuition.

Nor do I find any illumination in the doctrines of that school of philosophy, associated with the names of Reid and Hamilton, which founded all their premisses on intuition. Rightly or wrongly I seem to see in much intuitionist philosophy in either its older or more modern forms an unconscious obliquity of purpose. Sometimes we can detect a laudable desire to find an intellectual basis for doctrines which are instinctive and emotional in their origin. Sometimes there appears an attempt to found a new transcendentalism on selections from the fragments of scientific psychology. Herein intuition is made to do double work, not only its own in extra-conscious mental effort, but in harness with the imperfect arguments of faulty reason in consciousness.

The weakness that always underlies all ulterior purpose in the search for truth has been especially shown in the employment of the idea of intuition for every kind of work in any difficulty or impasse arising in moral theories. No one has better disposed of intuitional fallacies in the ethical field than Dr. Moore, when he writes: 'it is plain that no moral law is self-evident, as has commonly been held by the intuitional school of moralists. The intuitional view of ethics consists in the supposition that certain rules, stating that certain actions are always to be done or omitted, may be taken as self-evident premisses,' . . . 'it is the essence of Intuitionism to suppose that rules of action—like judgments of good in itself—are intuitively good in the same sense.'[1] As to Moore's own views of the part to be played in morals by the faculty of intuition, with which I have the good fortune to agree, more will be said later; but first some of the old well-known ground must be covered in a brief survey.

Perhaps the most accurate version of traditional views is given by Lalande's *Vocabulaire de la Philosophie*. Of the five kinds of intuition distinguished there, four refer to simple intuition alone, whose power is specially indicated by its immediacy, whether comprehended by the instinctive power of the senses or by the intellect. There is no reinterpretation by the intellect and intuition together of the truths afforded by simple intuition. The truths themselves are chiefly of that kind which serve as foundation for the play of the discursive reason and for the analytic and synthetic operations of the mind. Two important systems of thought are indicated as representative, both dealing rather elaborately with a form of intuition which has faded into the background of modern thought. In either case hardly any connecting links can be detected with the psychological and physiological investigations into the two faculties, such as I am following at present.

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[1] *Principia Ethica*, p. 148.

The first is the so-called Intuitionist School of Reid, Hamilton and Mansell familiar to English readers. Their teaching has been very ably summed up and criticized from the neo-Kantian point of view under the better name of 'évidentisme' by an able French philosopher.[1] In his whole account of their doctrine the term, intuition, is never mentioned once, showing how little it really concerned the essential argument.

The second and greater German school has made a more prominent use of intuition or *Anschauung*, but seems to me to have merely treated it as a pawn in the great game of metaphysics. Kant begins his *Kritik der reinen Vernunft*, I, 1, as follows: 'Die Anschauung bezieht sich unmittelbar auf den Gegenstand und ist einzeln.'—'Intuition concerns itself directly with the object and stands alone.' In fact it is left standing alone. Since Kant denied that intellectual intuition was possible to any but God, it still remains suspended above us in a wholly unfruitful way. Kant's other form of intuition of the senses was alone allowed to man.

Fichte and Schelling could not leave the conception of intellectual intuition so empty and bare. Schelling's interpretation of *Anschauung* deftly inverted the doctrine of his master for the benefit of man. Man, contended Schelling, patently has intuition; a statement which, if we are to take the faculty itself seriously, we must readily admit. Further, he has intuition of objects as the basis of his intellectual activity. Man has therefore intellectual intuition and in the Kantian sense is the creator of those objects of which he has intellectual intuition. So the sparkling metaphysical dance whirled round in the fascinating direction of Berkely. It was brought back again to the common-sense and psychological level by Bergson, who identified the superlative intellectual intuition of Kant with an 'intuition supra-intellectuelle',[1] which undoubtedly it is. It is also an undoubted fact that man possesses it, although he can only control it with difficulty and by circumspection.

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[1] Ravaisson-Mollien, *Philosophie en France dans le XIXme Siècle*, p. 224.

Turning back once more to the Lalande *Vocabulaire*, we find more pedestrian and more useful views given of the remarkable intuitive faculty by Locke, who separates the kinds of primitive truth which we know by intuition as those which are called truths of reason and truths of fact, and by Leibniz, who particularizes with foresight the modern view of simple intuition. He describes it as a power of grasping simultaneously a restricted succession of details, which would otherwise tend to flow into the mind in meaningless detached heterogeneity and flow out again before their real collective significance could be grasped. In his *Meditations* he writes that 'cognitio intuitiva' is our power of thinking together all the notions which go to make up the object thought of. He thus anticipates the tremendous emphasis thrown on the intuitive perception of successive time in the form of 'durée' or connected duration by Bergson,[2] and the similar building-up process contained in the idea of 'pesée' or intellectual notion of weight cited by Blondel. The particular difficulty overcome by perceptional intuition in realizing combinations, successions and accretions together has been succinctly stated by the latter: 'La qualité sensible n'est pas la seule donnée immédiate de l'intuition; si elle l'était, elle s'évanouirait, parce que discontinue, suffisante, incomparable, toujours parfaite et toujours disparue, elle ne serait jamais qu'un rêve sans souvenir.'[3]

Intuition by collective grasp is certainly the most familiar aspect of the extra-conscious working of the mind in perception. It occurs as a primitive perception-pattern[4] before the act of perception itself, and amounts in effect to a kind of first final cause, which must come first, in order to be a final cause and, if it were not a final cause, would not occur first. It is also the most easily explained form of intuition to those whose natural intuition is so strong and so efficient that they are totally uninterested in any description of the faculty itself. It is certainly more effectively simple and immediate than intuition of self-evident truth.

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[1] See Bergson's letter to Chevalier, 28.4.20, Chevalier's *Bergson*, pp. 293–6.

[2] *Données immédiates de la conscience.*

[3] *L'Action*, pp. 46, 66.

[4] For the part played by perceptual patterns I would refer the reader especially to the work of Sir John Parsons, often referred to in the text. Just as the term, action-pattern, will describe a large part of the theory of instinct, so the term, perception-pattern, will account for the chief characteristics embedded in simple perceptual intuition.

The fourth and fifth forms of intuition mentioned in the Lalande *Vocabulaire* are so nearly allied to inspiration, insight and connaisseurship that I can at first sight hardly find them truly included in my view of the special operation of the intuitive faculty, in spite of the fact that common use certainly justifies their place under the term in any dictionary. An apt quotation from M. Henri Poincaré steps in to justify one of them, as resembling the advanced form of intuition, which will be considered in the next chapter. 'Ce sentiment, cette intuition de l'ordre mathématique, qui nous fait diviner des harmonies et des relations cachées.'[1] There is hardly to be found in such a brief description any indication of the decisive significance and overwhelming importance of intuition in the sphere of mind.

Before going further in examining special instances of simple intuition we must resolve the same difficulty as met us with regard to instinct. Is intuition a faculty? If intuition be a faculty, how is it to be distinguished from intuitions which are special cases of its own exercise as a faculty? The answer is the same as in the case of instinct and instincts. Intuition is a faculty like Instinct. Equally so it results that it is not strictly accurate to speak at all of separate intuitions, any more than of separate unit instincts. In both cases common usage allows and perhaps compels us both to discuss unit-instincts as separate facts and to treat simple or immediate intuition as something rather different from the kind of advanced intuition which in many respects resembles insight.

A further and more complicated question will arise as to whether the intuitive faculty, which has many qualities of resemblance with that of instinct, is a veiled form of the latter faculty acting in a totally different set of circumstances, or whether they are not both, as I myself believe, to be treated as entirely separate faculties. The latter alternative seems to me to be so definitely indicated that the problem would not in my opinion seriously arise, if it were not for recent authority to the contrary. Professor Bergson, for instance,[2] returns repeatedly to the suggestion that both instinct and intuition have the same fundamental identity under accidental transformations. There is also our own philosopher, Mr. Bertrand

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[1] *Vocabulaire de la Philosophie*, p. 400.

[2] *Évolution Créatrice*, pp. 192, 201; also Bergson's letter to Höffding.

Russell, whom I understand to hold that intuition is definitely an aspect and development of instinct.[1] It is a subject which will receive fuller consideration in Chapter VIII.

Starting from the point of view that the intuitive faculty is a single and not a multiple thing, a capacity that is human in the sense that no one attributes it to animals, we can go on to discuss those forms of its manifestation which can be grouped under the title of simple intuition. Immediate intuition it may also be called, but the latter name is not quite distinctive enough, since even in advanced intuition there is some quality of immediacy, which is radical and inherent.

After the collective grasp of intuition in perception comes the intuitive recognition of simple or self-evident truths, also a wide subject. No one has dealt better with this section of intuitive knowledge than Bertrand Russell and I accept his careful and able discrimination between the various degrees of self-evidence,[2] particularly the broad discrimination between truths which concern only a single consciousness and truths about 'universals' which are matters of acquaintance to many different people. For reasons, however, which concern the peculiar relations between instinctive and intuitive knowledge, the different identity of which he would hardly admit, I place the possibility of obtaining self-evident knowledge much further out of reach than he or most people seem to hold. In fact, I find it easier to agree with Russell's objections to the existence of self-evidence than to allow validity to any of his partial exceptions.

Take, for instance, his refutation of Meinong's[3] thesis, that, while some self-evident facts are demonstrably false or highly dubitable to many people, the self-evidence of other self-evident facts is demonstrably self-evident. To maintain or to tolerate such a proposition would be tantamount to permitting all the interested parties, attainted in the course of an enquiry, to be giving evidence of good character in each other's favour before the same tribunal.

So, too, I agree with him in holding that neither coherence nor firmness of belief are criteria of absolute truth, but I attach more importance to belief than to any other buttress of truth. If any man's beliefs could be eternally irrevocable and totally impermeable, they would be true at any rate for him, so long as his consciousness continued active, consistent and approximately sane. Such an improbable degree of conviction is the kind of foundation for certainty aimed at by some minds and acquired to a small extent by habit, because, as Russell says, our subjective certainty is usually a result of habit.

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[1] *Our Knowledge of the External World*, p. 25.

[2] *Problems of Philosophy*, pp. 172, 182, 212.

[3] *Analysis of Mind*, pp. 263–6.

It is clear that, as he says, no form of self-evidence seems to afford an absolute criterion of its own truth. Perhaps I go to greater extremes in believing that any kind of knowledge, which claims to be approaching certainty by asserting that its principles are self-evident, is *ipso facto* a little further off from the probability of truth than many simpler judgments. Intuitive knowledge has a form of certainty of its own, depending probably on secret reliance on the reserves of memory, which is removed from the nature of self-evidence. Instinctive knowledge is knowledge *ad hoc*, aimed at a practical purpose and negligible outside it. The coincidence of the two, or rather their concentration on an agreed body of doctrine, when effected by great effort, gives a remarkable form of stable conviction of truth, for which perhaps self-evidence would be a wrong name.

In the restricted group of intuitive judgments, sometimes believed to be self-evident, which concern the moral world and include spiritual aspirations, the subjectivity of all personal conviction is privately admitted by most of us with regard to other people's beliefs, but not always firmly grasped with regard to our own. It would be hard to find a better statement of this general fact than Dr. Moore's significant sentence about Henry Sidgwick's ethical hedonism, whose fundamental proposition, that pleasure alone is good as an end, is posited as an object of intuition. 'I shall try to show why my intuition denies it, just as his intuition affirms it. It may always be true notwithstanding; neither intuition can prove whether it is true or not; I am bound to be satisfied, if I can "present considerations capable of determining the intellect to reject it".'[1]

On anything like the lines laid down already as to the instinctive and intuitive faculties, 'self-evident' has become a term devoid of meaning,[2] owing to the indetermination of the self and its inadequacy as a source of judgments. Intuitive knowledge is thus left without its traditional aim, since the activity of simple or immediate intuition has been usually reputed to be directed towards discovering self-evident truth.

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[1] *Principia Ethica*, pp. 59, 75.

[2] It is possible that some people have never remarked the ambiguity involved in the term, self-evident. It is skilfully avoided in the dictionary, which gives it as meaning: 'without need of demonstration'. Apparently the word should mean, on the analogy of self-contradiction, etc., 'evident to itself'. It is usually interpreted as 'evident in itself'. Close scrutiny, however, shows that any other meaning is impossible than 'evident to

What, then, remains as the avowed purpose or ultimate aim of the instinctive faculty? Intuitively the reply is given that truth and ideal aims are to be sought. If truth be so hard to find, the inference must be drawn that hope must take the place of expectation as an incentive and humility must be sought as an aid rather than presumption of confidence or assumption of evidence. To conclude that the end in view of intuition is philosophic or absolute value is in all the circumstances the best interpretation of an obscure situation. Truth cannot probably be separated from the other values. It certainly cannot be far behind them. To fulfil itself it will take nothing for granted in its premisses or final in its conclusions.

intuiti

The pale and ineffective idea of self-evident truth and the small prospect of attaining its knowledge by introspection are presented as problems equally by Bertrand Russell in the material world and by Moore in the realm of ethics. No doubt in both cases the impossibility of obtaining consensus of opinion among minds educated in various ways looms as the chief obstacle. But I doubt whether to either of them any doubt has arisen yet about the internal vacillations of the self, wherein to me lies a new source of uncertainty.

How can any single unshakably correct opinion take shape in a mind which is only nominally an individual mind, which is the daily battleground between feelings and thoughts? Where is the centre of judgment in a personality which experiences what are usually called instincts and intuitions and is guided by two other active extra-conscious faculties besides his conscious reason? Have we not rather good cause to be surprised at the prevailing unity of the actions of an individual? After all, although a man may ponder long over several alternative courses of action, including inertia, to meet any particular case of need, he will in

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the self', that is, to the person thinking, feeling or knowing. Any proposition which successfully assaults the identity and unity of the personal self will deprive the word, self-evident, of serious meaning. 'Evident to the general self' would merely appeal to a quite impossible consensus of opinion. As Dr. Pringle-Pattison remarked: 'the argument from *consensus gentium* has always suffered from the difficulty of defining in what the consensus consists.'

the end perform only one. Delayed action is simply inertia succeeded by action.

Although Schopenhauer and others have accentuated the will as the central unity of the individual, it is arguable whether anything resembling the popular notion of the will is not far from having attained unity in the sense of persistence or continuity. To my intuition, as Dr. Moore would say, the fact of a central will, if it be a simple fact, is not at all self-evident. Nor is the modern tendency in philosophy pressing triumphantly in the direction of undisputed personal liberty of the individual will. Even so stout a defender of 'freedom' as Professor Chevalier cannot put the case higher than in his superlatively fine phrase: 'la liberté, ou l'indétermination partielle'.[1]

The true road to unity, the track whereon we shall discover the mechanism of the will, has been pointed out by Maurice Blondel in his classic work, *L'Action.* He has brilliantly sustained the thesis that, if we would discover 'la liberté, ce scandale de la science', there is only one point at which it is to be found within 'la collaboration des puissances subalternes';[2] namely at the moment of action. Up to the decision in action all the conflicting forces of the self continue working, the unconscious no less than the conscious, each with its own duty of self-responsibility.

In his mental analysis, original so far as I know, Blondel has taken firm ground, which has been established by physiological research in results published long after he had written. If we turn, for instance, to the pulsing affective system with its nervous concentration in the medial nucleus of the optic thalamus, and the ably differentiated and closely serried convolutions of the cortex in the cerebral hemispheres, we see with equal clearness in both cases how strongly the two rival powers, real powers they are, have been entrenched with superb organizations and how subtly they yet retain their communicating network of thalamo-cortical and cortico-thalamic fibres, such as no conscious human skill can rival, to settle their perpetual differences.

The paths of transmission of impulses up and down provide endless opportunities for prolonged consultations, both conscious and unconscious, between the local magnates. For the sake of argument let us call them, the one an emotional and the other an intellectual centre. There is little doubt that the reality, as we know it, is probably still more complex and further realities, of which we know nothing, may be heaven knows how much more complicated! Then from the emotional to the rational control and backwards messages may pass indefinitely. For the inward debates, that are not only possible but necessary, we shall see later on how difficult it is to find any natural centre of gravity. Of only one fact are we quite certain. The so-called 'voluntary' motor system is finally controlled from the area of the cerebral cortex. It is only centrally stimulated action that combines the minor activities.[1]

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[1] *Vie de Bergson*, p. 148.

[2] *L'Action*, pp. 121, 165

Let me imagine a parable of some such a colloquy about unity and self-identity, as follows, between a sentient self and a rational self, using together our common human mechanism. In my opinion, to presume only a simple dualism between feeling and thinking is a bold simplification of still more difficult problems, since far deeper dualisms than this single one are probably concerned.

In this parable I will take as my text and starting-point the famous maxim of simple intuition, first propounded by Descartes and quoted by him as the beginning of all knowledge. It is taken from his letter to the Marquis of Newcastle, already mentioned.

COGITO ERGO SUM

Now I venture to question this primary inference, which does not deal with an elemental fact. Personal identity is not a natural certainty, but has been attained by long education and confirmed in most of us by habit. The real starting-point is: *Cogitat*, which means neither that I, nor that you, nor that he, nor that she thinks. It means merely that something is going on, which cannot yet even be called thinking. The right rendering must be: there is an awareness, which must be followed by a primitive curiosity, as yet far from being a mental enquiry as to the origin of the awareness. The right sequence, in what I suppose to be the simplest form of simple intuition, will be more probably as follows:

Cogitat = There is a state of being aware.
Quid cogitat = What is aware?
Sentiens cogitat = Something which feels is aware or perhaps thinks.
Quid sentit = What feels?
Cogitans sentit = That which thinks feels.

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[1] See note to Chapter IV on 'voluntary motor system'. All reflex motor action, not controlled from the cortex, is here taken for granted, as being ultimately referable to central judgment, whenever combined motor activity is required.

Ergo sumus = Then there are two of us.[1]
Non = No.
Moveo = I move.
Ergo sum = Therefore I am.

Having felt and thought and being at last definitely aware of my own movement, I think backwards and reflect that I willed to move. But certainly I moved first and the willing is a secondary inference. I doubt whether willing can be a matter of primary simple intuition to any of us. I believe the consciousness of willing, which in nearly all of us is very strong, and justifies us in applying an expressive definite name, such as willing, to a vivid state of consciousness, is pre-eminently a case of advanced intuition, the form of intuition which follows reflection.

Much as I reverence Descartes I cannot hold the central proposition of his system to be true. Neither our personal existence nor our will are matters of primary intuition. They are subjects and objects of advanced intuition, after both facts have been confirmed in us by numerous inferences from minor subordinate facts.

Simple intuition runs very easily into advanced intuition and the plotting of the line or curve drawn between the two is hard to decipher. It becomes impossible to come to a final conclusion as to what simple intuition really is until the end of the following chapter, when it will probably appear that the rarity of true intuition in a simple form makes its very existence extremely hard to determine. It may exist in elementary perception. It may have some share in detecting the reality and confirming the validity of eternal truths. But both these functions, if really elementary, are shadowy and unstable. Although often referred to by very different thinkers, there seems to be little general agreement about them.

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[1] The same idea has already been partially developed by A. Fouillée, *Morale des Idées-Forces*, p. 6. His object was not the analysis of the self, which he does not carry to any logical conclusion, but to make a classification of knowledge. *Cogito Ergo Sum* is to be the foundation of all theoretical philosophy, and *Cogito Ergo Sumus* is to be the foundation of all practical philosophy.

CHAPTER VII

ADVANCED INTUITION OR INTUITION AFTER REFLECTION

The certainty which accompanies the appearance of the result of intuition is a more elemental fact than the result itself. The certainty is immediate and generally durable. It is in itself a feature of psychical importance. Its significance lies in the fact that it is chiefly by the accompaniment of certainty with intuition that we recognize and become aware of its unconscious and extra-conscious origin. The degree of certainty gives a partial but probably not an accurate measure of the duration or intensity of the mental process which has occurred within ourselves, without giving us any information about the nature of the psychical operation except in the result.

Dr. Höffding, in his little notice on Guyau,[1] the young French philosopher, utters this profound and intelligent criticism of some of his views: 'Il n'est pas sûr que le conscient épuise l'inconscient ou lui corresponde totalement.' Now there is no mental faculty of which this far-seeing remark is more true than in the case of intuition. Its deliverances resemble the verdict of a secret court-martial, where the arguments and the voting are not recorded. In all probability instinctive extra-conscious processes for the most part exhaust themselves in emotion or in action, unless they are inhibited. Intuitional processes are more mysterious and more intriguing. They are not necessarily exhausted by their content, which appears in consciousness. They produce a result with an air of declaring that a certainty of this particular brand is not to be had twice and can be neglected only at peril. If they often convey the impression that there remains more behind than the result, which has appeared in consciousness, there is an implication, not necessarily correct, that what remains behind is entirely confirmatory of that which is given.

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[1] *Philosophie Contemporaine*, p. 130.

Given simple intuition and advanced intuition side by side, of which can the greater certainty be asserted? Probably the first claims more confidently that its results are self-evident. Yet in discussing self-evident truth we have seen that the claim cannot always be maintained against reason. Advanced intuition is probably a form of unconscious reasoning wherein the fruits of some experience are to be detected. Memory enters into it. Memory of failure chastens it. Memory and re-memory constitute reflection, which is the schoolmaster of intuition.

Advanced intuition is a method of intelligence whose factors and whose procedure are not entirely patent to us, but we know what are its chief constituents. The active principle resembles our conscious reflection. The material is supplied by study, effort and habit. Study and effort we understand. In the finished result, whether it be a judgment of practical conduct, a happy design in composition, bridge-building or architecture, or the solution of a mathematical problem, the material elements show themselves unmistakably. Any deficiency in material, such as fragmentary knowledge, or inadequate technical training, or insufficient preparation, stand revealed.

Habit, the kind of habit that is here required, is more difficult to describe, so hard indeed that I turn to the slightly different sphere of morals for a solution. Jesus in rebuking his disciples revealed the secret of obtaining a spiritual insight and right guidance and quality of character, when he declared that repeated action was expedient and necessary for perfect development: 'Not every one that saith unto me, Lord, Lord, shall enter into the kingdom of heaven, but he that doeth the will of my Father, which is in heaven.'

The attitude of mind described is one which accompanies great and sincere effort, a faith that a result will follow over and above the normal conscious result. It is the creation by the self of an intense inward strain, coupled with a confidence that the strain will be released only when complete satisfaction has been secured. The desired assistance required from the intuitive faculty, being extra-conscious work, is not obtainable at the command of the will, but by some indirect devotion of energy steadily applied with a persistence that resembles habit.

Reflection is the name we give to the active intellectual factor, where there is submission and resubmission to further thought processes, not only of the original material of thought, but also of the various forms remoulded by repeated reflection. Given the material, remodelled by frequent conscious manipulation and criticism, the faculty of intuition works silently in a fashion which most closely resembles unconscious reflection. As to what this process may be we may best ascertain by turning once more to authority.

Reflection is a function of thought, the act of thinking, both of them being mental processes in consciousness. Reflection, however, does not essentially mean, although it is often carelessly used in that sense, turning the same thing over and over in the mind. Strictly speaking, that would mean reconsideration. Reflection should more accurately refer to a fresh thinking of an already accomplished and suitably modified thought, referring to a given external object or situation of the self. It is thus far more complicated than simple thought, because in the course of every operation the material becomes modified.

In Lalande's *Vocabulaire* [1] the most accurate sense of thought is taken to be a function of understanding or the reason applied to grasp the material of knowledge on a level higher than that of perception, memory or imagination. M. Ribot recites the activity of thought as consisting of the two fundamental operations, analysis and synthesis; the former dissociates and separates elements; the latter associates and reunites them. Dr. Jung regards the association process as not properly thought, but presentation, or a stage of perception. Thinking itself he divides into an active process under the guidance of the will and a passive process which accepts occurrence. In my opinion it might be difficult under this classification to distinguish passive thinking from mere association, but it is feasible, if a clear hold is kept on logic in such sequences as: shot, death, gun, crime, motive and not as: shot, gun, dog, autumn, holiday; nor as: shot, death, war, wounds, hospital, nurse, etc.

Comparing intuition with thought, the former will probably resemble the latter, while exhibiting less of the synthetic or analytic processes of thought, which are naturally enhanced by the greater opportunities offered in consciousness. The fact that chiefly guides us through the labyrinth of the study of intuition is that it is a process not set in motion by the will, but only engendered, if at all, by roundabout methods and continuous application of effort. Intuitive thought would most probably resemble that kind of passive thought described by Jung, which is not pure association.

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[1] P. 594.

It is important to retain a firm hold on the reality that intuition is an extra-conscious process, of which we positively and directly know nothing at all. The study of ordinary behaviour gives us no clue to it and inspection or introspection very little. We hardly even know that it is mental. Its operation, so far as we can observe it, makes one think of a ferret going into a hole in the side of a hill and coming out some way off dragging a rabbit. To follow its hidden operation we have nothing to guide us except inference, for which there is slender material.

There is again the difficulty of describing by words any mental process or string of successive mental items or psychic states which are wholly extra-conscious and can only by distant analogy or presumptive reasoning be supposed to resemble conscious mental operations. Every sentence of our discussion must be registered as hypothetical.

Intuitive thought may be taken to consist mostly of passive thought, guided by individual habits. Thus Juliet will not think intuitively like Lady Macbeth, but like her conscious self. When the intuitive process is once started, it will not keep company with conscious thought, except by reverting to consciousness and presenting its results for criticism. Such an inference is inevitable, if we come to the probable conclusion that both intuition and reason employ the same cerebral organs. The intuitive process will presumably feed on itself, each stage of mental effort becoming the material for the next stage, thought-process eating up thought-result, so to speak, in series until the final presentment.

The form of the final presentment, finished and self-confident, affords some evidence that all the supposed processes of thought may best be resumed in the description of intuition, as a special extra-conscious operation of conditioned reflection. The French term, 'intuition réfléchie', is the most accurate and appropriate name for any form of it that is not simple and immediate intuition.

Reflection, conscious reflection, must next be examined for a clue. What happens within our minds when we examine the relations of A and B? It is probable that we think in succession of A and B in that order and obtain a conclusion C, but in reflection on C, we may re-examine B and A in the reverse order, obtaining a conclusion D, which resembles C more or less. It is probable then that our further reflections will henceforth concern themselves chiefly with the relations of C and D more than with any reconsiderations of either the A to B relation or the B to A relation. Supposing no new facts come in, we shall then turn over C with relation specially to A and turn over D specially with relation to B and so forth. But only very gradually A and B will slip away into the background, until from the C and D relation we come to something stable in E. The conscious intellect will generally not go beyond E, unless it is induced to bring in fresh facts for consideration from the outside, as most usually happens. It will either take the conclusion E for a final proposition or let the matter drop.

We have all, however, had the experience of both letting the matter drop and not letting it drop. It is a case of an apparent reversal of the supposed self-evident law that one thing cannot be in two places at the same time, or, if one likes to phrase it so, cannot both be and not be. In the latter phrase the conclusion E both exists and does not exist for us. We may not think it over again and yet it may reappear independently of or against our conscious will, especially if we worry about its original subject-matter. In the former phrase the conclusion E is both inside our spatial mind and outside it, as an extra-conscious mental event. It is inside it because we can pick it up at a given moment, say five o'clock, if we require it for writing a sermon or answering a question in the House of Commons. It is outside it, because, if we had a certain kind of accident, it might never appear again in consciousness, however long we lived in apparently normal health.

We have all also had the similar experience of dropping the conclusion E with a silent purpose, which takes the form of either deciding not to worry about it or of expressing some anxiety as to its final relation to our wishes or interests. It does not much matter which we decide to do, because it is almost certain that any decision of the will has no effect in one way or another on what may happen to the conclusion E.

Several distinct things happen to E of which we become aware later on. Some form or perhaps several forms of E pass into our memory. They do not always go to the same place (I use a spatial metaphor with some reluctance) in the memory; one form, probably the very best form, may go into an inner memory behind a door, which we cannot open when we wish; a second-rate form of E, embodying slipshod versions of A, B, C, D with E passes into a large available memory cupboard, where it gets sadly knocked about, but can be got at easily. Those memory transactions are complicated, but not so complicated as another group of psychic events concerning the conclusion E.

Conclusion E, with all its constituent features, goes into a kind of mill, which seems to work day and night, but better at night. Our phrase of 'sleeping on it' gives a particular form to this hypothesis which we all recognize. Out of this mill comes later something which we perhaps recognize as E, not simply battered about by a slipshod memory, but with distinctly new features, such as K, which is a form of E, very like E + F + G + H.

The problem of how E is converted into K gives us an ordinary case of advanced intuition, and what happens to E, before it emerges as K, can only be determined by analogy with conscious thinking. The problem has now been narrowed down to a speculation as to whether unconscious or extra-conscious cerebration more closely resembles direct thinking or the special form of thinking called reflection.

There is very good reason to suppose that, granted the existence of extra-conscious mental work of this kind, it must resemble reflection, because we know, or almost know, one definite fact. No new elements are likely to be imported into the extra-conscious convolutions of our ideas about A and B. This is quite different from what happens in consciousness. During consciousness we have either become aware of subsidiary *a* and *b* facts about A and B, or we may expect to become aware of them. The expectation of new facts is of course a kind of new fact in itself. Probably in the extra-conscious situation A and B are left alone by themselves or are only accompanied by memory.

Now when conclusion E is dropped from the conscious mind and presumably allowed to pass out into extra-consciousness, we may use the simile that it probably takes with it all its luggage A, B, C, etc. The working of the extra-conscious mill, always supposing that it works, is probably confined to recombinations of a set quantity of material. The term reflection therefore comes nearer the work of intuition than thought, because the material for each turning over of conclusion E will be through F, G, H, etc. . . . down to K, E alone will be the subject-matter for F, F for G and so on. Intuition must be represented in the most probable hypothesis, as resembling the process of conscious reflection.

So far we have assumed reflection to be redoubled thought, but thought of a very simple kind without admixture of forward or backward introspection. Reflection has differed from reiterated thought simply owing to changed subject-matter. Thought will consider A twice or three times, whereas reflection will take A changed by thought as its first subject-matter and then its own product or version of A for its second subject-matter. In reality reflection is far more complicated. As Professor Blondel has pointed out, it contains at least three phases or natures. His admirable exposition contributed to the Lalande *Vocabulaire*[1] cannot be cut short. It represents the finest attempt at introspection that the human mind has ever succeeded in attaining.

'Les divers sens du terme réflexion pourraient, ce semble, être exposés de façon suivie et systématique. Si d'abord, d'une manière générale, la réflexion implique un redoublement, plus ou moins spontané ou plus ou moins volontaire, et comme un repliement de la vie psychologique sur elle-même (d'où inhibition apparente et provisoire), elle constitue d'autre part un fait nouveau, une initiative originale, une force ultérieure et supérieure à celle des éléments qui en ont été l'occasion. Et cette force s'applique ou s'oriente en deux directions symétriquement inverses.'

'Tantôt en effet elle vise les conditions antécédentes et efficientes du fait de conscience ou de la réalité donnée qui est l'objet de son étude et qu'elle rattache à des idées générales ou à des lois, et c'est une rétrospection analytique.'

'Tantôt elle se porte, pour ainsi dire, en avant vers l'intention et la réalisation finale, concrète et singulière qui est le terme pratique de son mouvement complexe et total; et c'est une prospection synthétique.'

'Et si le mot réflexion désigne également ces deux démarches si dissemblables, c'est que, d'une manière ordinairement implicite, mais qui peut être explicitée, il y a entre elles solidarité: la réflexion, quoiqu'elle semble s'arrêter dans les deux sens à des intermédiaires bien divers et bien indépendants les uns des autres, n'est possible que parce qu'elle tend à constituer, dans l'unité du sujet d'inhérence, la solution du problème ontologique et la solution du problème de la destinée.'

In view of the peculiar power of reflection we may emphasize the special sense and importance attached by Blondel to all mental operations which have been submitted to this process. The term, 'réfléchie', has with him acquired a technical significance of very definite character. 'Volonté' is one thing and 'volonté réfléchie' is a higher power of the same kind; not merely resolute will, but will which has been deliberately willed. Similarly 'connaissance réfléchie' is knowledge, which has been turned over, verified and known as known. 'Conscience réfléchie' is consciousness that is aware of its own capacities; consciousness that has been criticized by self-knowledge. 'Intuition réfléchie' is to be contrasted with simple or immediate intuition; intuition, whose results have endured criticism; intuition, which is awake to its own deficiencies. The advanced intuition of a trained mind will be superior to that of those who have allowed themselves too easily to rely on intuitive inspiration.

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[1] P. 694.

Consider in the light of Blondel's splendid analysis what may now happen to conclusion E about A and B, left alone with memory in extra-consciousness. True, no new subsidiary facts will come forward from outside, such as *a* or *à* about A or *é* and *è* about E, but intuitive reflection has all the more power of concentration on the problem. First comes the analytic retrospection of given facts A and B in their forms C and D. Secondly arrives a reaching forward process to a fresh succession in synthesis of the aspects of E called F, and of the aspects of F towards G, and so on towards H, and so on to K. Lastly there begins the review and comparison of all memories allied with the elements of conclusion K, etc., etc., elements having in view the supposed interests of the inner self in relation to the comprehensive problem of ultimate destiny. Under the possibility of drastic changes, which we can thus imagine, and of other changes, of which we know nothing at all, is it surprising that we sometimes are faced with the emerging consequence, that the ultimate conclusion K is far better and more accomplished than any conclusion E? It is not necessarily more complicated; it is very often simpler and always more finished.

However gigantic the superstructure of hypothesis may seem to be that has here been built up on the supposed process of intuition, of which admittedly we know nothing and of which very little can be accurately inferred, is there any other tangible thread of connection possible between the known facts of a conclusion E being dropped overboard, so to speak, from the conscious mind with the subsequent appearance of another cognate conclusion K in the same consciousness? In all the considerable literature about intuition I have found none.

What does the conscious mind, which accepts K and remembers E with some life-like certainty, attempt in solution of the problem of relationship? I appeal to the recollection of the many, who have undergone the experience, that almost invariably the earliest efforts are swiftly made to preserve the full identity of the new K conclusion, before it is lost or before it is injured by the intruding recurrence of the original elements A and B, etc., including the specious conclusion E, which begins to assume a sort of credit for the best features of the final conclusion K. There is very little time for analysis or introspection. All the elements begin to jostle one another. To preserve the uninjured completeness of the idea K requires some effort.

Yet occasionally both K and E emerge sufficiently distinct from each other for us to fix some fleeting identity to each, and we are permitted to begin the backward analysis that may throw light on the possible process. No memory of the process exists. The significant form of the result alone has to be stamped into conscious memory by effort and repetition. Reverse inferences, however, can be made from the construction of K to the construction of E, which give us more than a shadowy justification to suppose that some process has taken place which more resembles reason than either vision or miracle.

In startling cases both vision and miracle are evoked as causes. But again I appeal to common experience as to cases of pedestrian intuitive reasoning, which are not very infrequent in fact, although it is rare to find opportunities so clear as to bear scrutiny and analysis. I appeal also to the evidence of M. Poincaré, mentioned in the last chapter, and I can quote Dr. Broad. 'When a person is greatly interested in a problem, this problem is often worked upon and solved by processes which are unconscious relatively to that part of the mind which is normally in control of the body.' [1]

If the view be adopted, that the intuitive faculty is set to work altogether on consciously given material, what becomes of the element of mystery in intuition? The aspect of certainty, which enshrouds the advent of intuitive judgments and solutions, is a trait to which great importance is attached by all who have experienced them, and no little part of such assurance as to their verity is due to the uncertainty of their origin, and to the belief that there is in them an added element, which cannot be analysed. Are we to conclude that the supposed certainty rests on a delusion, and that there is no room in true intuition for a superior quality in our intuitive judgments which may come from outside?

Probably we are justified in believing that in some respects our intuitive conclusions have a claim to be nearer the truth than many of our reasoned efforts, provided always that there is no undue reluctance to submit the former to reason. Intuition has a superior process, which is not above being tested.

We are further certainly justified in allowing that an added element comes into the extra-conscious mind to reinforce the given material on which our intuitive faculty is set to work. We know definitely what it is. There are vast stores of memory unavailable to the conscious mind, intractable to the conscious will, containing details and items which are unlikely ever to appear in full consciousness and probably some vital details for ever forgotten by us, shreds of truth thrown on the waste-heap by our foolish and careless consciousness and for ever and ever irrecoverable except by the marvellous capacity of intuition.

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[1] *Mind and its Place*, pp. 544–5.

Finally, is there anything beyond the memory to justify the attribution to the intuitive faculty of vision, of mystery, of insight more than humanly we can claim? There is a popular inclination to emphasize more in intuition than inspiration, which I believe to be correct. But it would certainly hardly deserve the name of mystery, if I could define it. I merely believe in it and although I have no doubt that some organ somewhere in us, like Descartes' magical pineal gland, is the vehicle of the incoming power, I neither know the organ nor have any reasonable account to give of the power.

Here we are perhaps bound to ask, whether the intuitive faculty has the monopoly of unconscious mental processes. It would be hard to say. It would also be hard to deny the possibility of mental processes to the instinctive faculty. All we can conclude at present is that there is no direct evidence of anything that can be called positive instinctive thinking. The functions of both instinct and intuition may to some extent overlap, but their spheres of activity certainly seem to be distinct.

Set occasions for the working of the intuitive faculty on problems of affective importance and therefore of instinctive interest do not cover the same or the whole ground as the capacities of the instinctive faculty. There are many problems of life pending over conscious minds where no doubt extra-conscious work of a mental character is prosecuted with little relaxation. Any careful introspection will give evidence of conclusions to which all premisses are lacking on all kinds of subjects. It is more easy to suppose that cerebral operations of unconscious or extra-conscious origin have been to a large extent responsible for them than to be justified in attributing a quasi-intellectual character to causative or instrumental processes emanating from instinctive sources. Still, is it not wise to bear in mind that active instinctive intelligence is also possible as well as intuitive perception, intuitive reasoning and intuitive reflection?

We are thus brought immediately to the problem of the comparison of the two faculties of instinct and intuition. On the way to that research, which will have to be undertaken in the next chapter, it will be well to enquire what can be the organs of intuition and where are they placed? We have to frame a method of comparison between intuitive processes and their instruments, starting from the point arrived at in our hypothesis. We are inclined to believe that there has been established a case for the close resemblance between the conscious ways of thinking and reflection and the extra-conscious processes of intuition. It is therefore probable that the cortex of the cerebral hemispheres remains the human instrument for both processes of thinking and intuition, a conclusion which will be considered at much greater length later.

Perhaps we are also entitled to reason backwards, that thinking is a process not necessarily conscious. It might be better some day to devise a new and more elastic word for the subconscious process, which corresponds to the conscious mental activity providing for our thoughts and reflections. Unconscious cerebration has been frequently employed in this connection. Cerebration, however, is a term which prejudges the question, not yet certainly solved, as to where extra-conscious thinking really takes place within us, and in using it we should be neglecting the very important part played in our mental selves by minor non-cerebral centres, affective neural assembling-points and motor relaying stations.

What is also to my mind quite as important at this stage of self-inspection is not to accentuate by our use of terms the differences between conscious and extra-conscious processes, differences which are obvious enough, but to make the most of all available analogies and parallels which will help us to understand obscure thought-habits, on whose tracks we are for the first time fastening our unaccustomed attention. It is inherently probable that the amount of quasi-thinking effected in us extra-consciously greatly exceeds anything of that kind of which we are fully or partially aware.

Another inference we are reasonably invited to draw from a close analysis of the play of the intuitive faculty is that it is singularly free from all affective influences. As the intellect has the reputation of being cold-blooded, heartless, and independent of the bowels of compassion, according to metaphors older than any language we know, so intuition seems to act by similar laws of indifferentism. If we are to particularize locality for the operation of all forms of intelligence, the intuitive form, owing to its non-passionate character, has a second claim to be lodged in the cerebral hemispheres. In fact, if it is permissible at all to argue from body to mind,[1] the location of intuition is fixed more by this fact than by any other.

Advanced intuition is probably unconscious cerebral thinking on materials that are given by conscious experience and by conscious thought. Simple or immediate intuition is evidently something of the same kind, but without the problem or premisses supplied to its faculty by the working of the human intellect in consciousness. Advanced intuition, intuition which is a continuous extension of the process of reflection, plays a large part in our mental history and the conditions under which it co-operates with our waking brain will give future psychologists an ample field for research.

There is probably very little simple intuition, intuition of the most elementary kind. Without given material intuition has very little to work upon. As soon as material appears from the intellectual mill, the intuitive faculty passes into various advanced stages. Still the term, simple intuition, has been freely used in connection with the process of perception, which is the earliest source of material supplied to us. Intuition in that sense would imply that kind of superior faculty of perception which men possess as opposed to the acute but badly co-ordinated sense-perception of animals.

No doubt the 'intuition sensible' of Blondel refers to the perceptual variety of intuition, as is still more clearly the case with Dr. Broad's 'intuitive referential cognition'.[2] In a more elementary way does Kant's maxim refer to the simple form of intuition: 'Die Anschauung . . . bezieht sich unmittelbar auf den Gegenstand. . . .' The claim of Spinoza's third form of knowledge, as described before, to be an essentially simple and immediate intuition, is one which I willingly admit; in fact, since I see very little room for the function of simple intuition in recognizing self-evident truths, it seems to me that simple intuition cannot be much else. It is the extra-conscious recognition of the simplest form of truth, not as self-evident, which carries an implicit form of criticism. It is still simpler than Kant's pompous phrase and can only occur, if it occurs at all, where the conscious intellect has broken down or made a prudent surrender. If conscious reason were personified within the self, it might be represented as saying to the faculty of intuition: 'Here at this barrier I have nothing to offer you; go and do your work alone; it is for you now to make bricks without straw; return and tell me what you have found to be the eternal truths.'

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[1] See note at the end of this chapter.

[2] *Mind and its Place*, p. 636.

Since no other organs can be specifically referred to intuition, as in the case of instinct, it is provisionally reasonable to suppose that the intuitive faculty does its work during the odd hours of our life (no doubt the greater part of them), with the 10,000 million odd cells of the cortex of the cerebral hemispheres, aided by the comparatively small number of association fibres. It seems difficult to suppose that the same machinery should be actuated unconsciously, at the same time that it was carrying out conscious work. Indeed we are sufficiently aware from introspection that intuitive activity coincides with complete mental rest and notably with sleep.

A plausible and almost necessary argument thus arises from probability that the work of the cerebral cortex is either conscious or unconscious during any one period. The periods may be very short and rapid alternation between conscious and unconscious cerebral operations may be the order of the day. The course of the night is more difficult to follow. Breakdown may come more from too frequent changes than from specific overwork in consciousness.

It might be argued that one hemisphere can work unconsciously, while the second appeared before the human personality with all the credit of successful performance both ways; or vice versa.[1] Yet the clear evidence of co-operation between the intellect and intuition, though not very abundant, quite negatives this proposition. Besides, there is no evidence for such an assumption and some presumption to the contrary. Something about memory difficulties, to which I shall have to refer later, leads me to suppose that the separate grey matter of the duplicate hemispheres are serving quite another purpose.

If the intuitive organ or organs are really located in the upper brain, as I conclude, the simplicity and directness of intuition will be largely accounted for. The entanglement of instinct with the machinery of sensibility is perplexing, as we shall see in a later chapter,[1] when we come to consider the question in detail, and involves our consciousness in all the storms of emotional excitement. Compared with instinct the intuitional problem is a simpler affair. Such confusions as arise are due to inter-cerebral communications.

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[1] This form of argument reminds me of the story of a member of a district council, combating an attack from his opponents, who said: 'We have been maligned by the gentleman opposite on the ground that one half of this committee does all the work and the other half does all the talking. As a matter of fact, gentlemen, the exact reverse is the case.'

Many of the complications that surround our unconscious activities are due to the fact that they cannot be referred specifically to either the instinctive faculty or to the intuitive faculty alone. The system of inter-cranial communications is superb in the human animal and gives room for endless consultations between powerful influences within and without consciousness. There are no doubt severe rivalries as well as confusions. It is the supreme merit of Blondel's great work on Action that he recognizes how such individuality as we have is to be found there only. Even the will is not the single will until it has been decided in action, when, as he says very acutely, probably the forces which have resisted any particular choice of course up to the moment of action join finally in making ultimate action more effective. A real individual power is thus created by the alliance of forces which up to the moment of action have been pulling in different directions.

NOTE

Interaction of Mind and Body. We are now drawing near to the essential and inevitable conflict between two methods. The perilous point is discussed in the preface, as to how far it is legitimate at all to argue from mind to body or from body to mind. There is no complete satisfaction within our reach. Obviously in the text of Chapter VII I am preparing expressly to do both, as I am less conspicuously doing elsewhere. In order logically to justify a double course of inferences, it must be held that some form of interaction is established as probable, or the greater part of my argument will break down. I hold interaction to be substantially a fact, even if the process is difficult to describe. No doubt both mind and body move forward under a common compulsion, so that interaction is a clumsy term, implying causation on both sides (*vide* Dr. Broad), whereas the correspondence between mind and body is something more intimate than reciprocal causation would be likely to effect.

Still I cannot escape using causative language both ways. By an inference from body to mind in the instinctive investigation, I conclude, from the existence of bodily machinery, that a certain kind of crude intelligent action takes place independently of the cortex. This action is for the most part extra-conscious. In the intuitional part of the argument, on the contrary, I am chiefly arguing from mind to body. I infer from conscious mental phenomena that most of the finer extra-conscious mental processes, such as intuition, are also physically conditioned, as in the case of instinct, and are probably dependent on cerebral mechanism. It follows that the cerebral organs govern the operation of extra-conscious intuitional processes in the same way that they condition conscious thought and reflection.

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[1] See Chapters XVIII and XIX.

In many cases the argument is unavoidably mixed. If there is bodily machinery, I argue that it probably acts in a certain way with certain mental results. From the hypothesis of a given mental sequence I infer the existence of some kind of nervous organization and storage capacity. In all the memory part of the case the necessary assumption of the existence of enormous storage facilities would stagger every imagination, if it were clearly stated. On this point Dr. Broad (*Mind*, etc., p. 359) rather severely criticizes Rivers for his phrase: 'stored up in the unconscious'. I cannot quite agree with his strictures.

An exactly similar difficulty in arguing both ways has no doubt been often felt before. Mr. Bertrand Russell, however, points out that the discovery of new methods of detecting unconscious desires has made more acute the necessity of examining the truth about mind and body by the double method of reasoning. He has no hesitation in justifying it and using it himself. I venture to quote him without endorsing all his views, as to the 'neutral particulars' which lie at the base of mind and matter. 'If, as we maintain,' he writes in the *Analysis of Mind* (p. 34), 'mind and matter are neither of them "the actual stuff of reality", but convenient groupings of an underlying material, then, clearly, the question whether, in regard to a given phenomenon, we are to seek a physical or a mental cause, is merely one to be decided by trial.'

CHAPTER VIII

INSTINCT AND INTUITION COMPARED

To discover, even to be convinced of, the independent existence of both instinct and intuition only takes us a little way towards ascertaining exactly what they are. Both the one and the other are forms of intelligence and they appear in human mental equipment chiefly as extra-conscious faculties, which have rather different functions to perform in our mental life. That is my unalterable conclusion, in spite of the entanglements which both popular and philosophic language have imported into the subject.

However firm the conclusion may be, it serves for the present only as a starting-point for two immediate enquiries. Do the two faculties belong to the same branch or stock of the human equipment, as *a priori* we should almost be inclined to infer? And, if they are quite separate, to what organs in the human frame must they be referred?

It has hitherto been supposed that all human mental phenomena must be consigned to the head and in the head to the upper brain with its double cerebral hemispheres. If instinct and intuition have not a common faculty origin, and if they are not equally related, perhaps each in its individual and peculiar fashion, to the same set of physical organs, we are faced with two problems.

The first problem, with which I shall deal in the present chapter, is to disentangle the close relations between instinct and intuition, to sum up all their resemblances, to analyse all their differences and to decide whether they are two diverse aspects of the same faculty or two entirely different faculties altogether.

The second problem must depend on the first and, if it becomes clear that there are two faculties, each with its own physical location apart from one another, we shall have to face the entirely original difficulty, such as I believe no one has had to face before, in seeking for another and a separate seat for human intelligence apart from the convolutions of the cortex. A formidable task of this kind can only be begun in the two following chapters.

Behind the second problem a third very difficult but subsidiary problem is masked. On the hypothesis that we find a separate seat, physically speaking, for the intelligence demonstrated in the instinctive faculty, apart from that of intuition, we shall have to discriminate again between the organs of feeling and those of intelligence in both cases. Is there or is there not another duality in the organs of sensation, of emotion and of feeling?

How are we to discriminate between such elementary but powerful psychic states as feeling and desire on one side and thinking and knowing on the other? When Dr. Driesch wrote his work on the *Crisis in Psychology*, he was no doubt anticipating some of the immediate problems that were coming upon us.

It has not been easy to track down to one common source in each case the varied manifestations of instinct and intuition. Fortunately, although the philosophical and physiological definitions of both have been uncertain and perhaps misleading, common language has led us very steadily to some real truths in classification. It has been said with sarcastic emphasis that we are too much governed by words, but for my part the lead given to science by words, especially by the popular use of words, has always had my profound respect. In the study of Value, very closely related to Instinct and Intuition, as we shall see later on, popular ideas about it gave me the only sure guide to its meaning.

The term, instinct, was found to have four separate meanings attached to it, all of which were important, three of them being forms of the fourth. Instinctive behaviour was a collective term embodying many combinations of unit-instincts. Advanced instinct was a developed form of the operation of the essential instinctive faculty, which in itself summed up the whole subject.

Similarly the intuitive faculty passed through the three important phases of simple or metaphysical intuition, of immediate or perceptual intuition and of advanced intuition, which was the highly developed form of the intuitive faculty itself.

In neither case did any of the formal definitions cover more than a small part of the ground and the careless and comprehensive use of both terms in the widest sense led us far more surely to an essentially right view.

I come now to a point where no help is given us either in common language or by the philosophers as to the relationship or identity of instinct and intuition. Authorities as far apart as Descartes, Bergson, Maurice Blondel, Sir Oliver Lodge and Bertrand Russell mention instinct and intuition in the same breath, in the same sentence. If they are not mere picturesque or rhetorical expressions, the question should have been decided long ago, whether instinct and intuition are really two separate realities or two different forms of one and the same thing.

The arguments for bringing the two faculties together and the temptation to fuse them into a single identity lie on the very surface of the conspicuous phenomena which make them interesting and important. The resemblances come forward to meet the eye of enquiry. Prominent among them, and no doubt the original cause of a very natural confusion, is the way in which the operations of both instinct and intuition begin within the extra-conscious parts of ourselves, to speak in a local figure, and emerge equally unexpectedly into the light of everyday consciousness. The neglect of our own extra-conscious processes and the mystery which we have permitted to grow about them have built up a wall surrounding consciousness. There is a natural tendency to regard everything as related that comes from the other side of the partition surrounding the conscious exercise of our reason; or, to put it in another way, phenomena really quite different in their origin are supposed to be identical, simply because they both occur to a large extent in extra-consciousness.

The impulses of instinct and the promptings of intuition are engendered in total secrecy. When they do appear, they are necessarily almost complete, and their advent into our consciousness is sudden. Sometimes we may almost say that their insinuation into our conscious thought-processes is furtive or at least lacking in frankness. Because we are not on the look-out against them nor indeed expect them at all, they are inside all our artificial conscious defences before we become aware of their existence. Instinctive urges and intuitive inspirations attack our minds at different points, but they both follow the same tactics of surprise and spring fully armed like Apollyon or Minerva into our mental company before we can decide whether we like them or not.

The attributes of promptitude in appearance and completeness in equipment carry with them two other attributes, allied but distinguishable. Certainty is imposed upon our minds and a kind of dictatorial peremptory challenge is issued for immediate obedience.

Instinct in this respect drives more forcibly than intuition. Since instinct urges us to practical courses, she has to be more impatient and to threaten us with pain or extinction or the loss of our favourite ambition, if we do not at once follow her guidance.

She is as animal in character as Shelley's pard-like creature, beautiful and swift.

Intuition has a different procedure. To personify her like instinct above, she is more like the Sibyl who offers us the whole of wisdom bound in calf and with wide margins or perhaps the Corpus Poetarum of Descartes. The only threat she has available is to withdraw her offer at once or to halve it or mutilate its usefulness. We must seize the occasion, she suggests, without hesitation in order to secure the full gift of completeness and comprehensiveness.

The certainty and the dictation are psychologically linked. Whatever the extra-conscious process of preparation may be, it seems to carry within itself a conviction of its own perfection or of the perfection of its product that is purely provisional. The atmosphere of certainty vanishes like a delicate scent. The psychic content of the portentous message undergoes the process which Shakespeare has so well described, in being 'sicklied o'er with the pale cast of thought'. Our instinctive resolutions waver. If neglected, our brilliant intuitive inspirations lose their firm contour or appear as empty shells. Very often it is better so.

More remarkable still, however, is the similar behaviour of the instinctive and intuitive faculties when they have both submitted their clear calls to the cold criticism of reason. They do not altogether die. The dreamlike substance of their typical and confidential messages fall into the ground, but they survive and reappear sooner or later in transformed and more persistent semblance.

It is the resurgence of instinctive and intuitive motives in their advanced forms after long periods of preparation, reflection and, as I firmly believe, re-inspiration, which constitutes their valuable quality. It is also their essentially human quality. For all we know, animals may have their high instincts and even their intuitions, but there is no mark or sign in their conduct or their continuous behaviour that they are ever influenced by what we vaguely term principles.

Principles, both moral and political, are, to my mind, most probably the outcome in man of some sort of permanent reconciliation between, or perhaps fusion of, advanced impulses of instinct and intuition. For me they constitute the best argument that can be pressed in favour of the ultimate identity of the instinctive and intuitive faculties. But on mature reflection it appears to me more probable that the late union of the two forces in close co-operation under the guise of principle or policy is not sufficient proof of their identity. It is rather evidence that both intuitive inspiration and instinctive energy are finally tamed and unified in the complete self, which ultimately forms one single personality.

Finally, we may sum up the common features of instinct and intuition by recalling what was said of each separately, that both faculties are independent of the will, at any rate of that conscious will which we apply like a hammer for purposes of initiating action. We may release the action of instinct by something like a trigger or detent, which works very badly. We may metaphorically open a tap to see whether the stream of instinctive energy will run as it may, but we cannot force it, if it is not there. As for intuition, it is notoriously mysterious and evasive. We must supply it with material, we must take the right mental and moral attitude, we must resign ourselves to expectancy and inaction. But the response unfortunately does not always appear.

Clearly we have in the case of the will and its comparative impotence another instance of the independence of unconscious faculties. It is the nature of extra-conscious processes to choose their own time and conditions of operation. When we have thus summed up all the consequences which arise from the unconscious origins of both instinct and intuition, we have exhausted the common features of the two faculties, for there are no others.

If the argument for the single identity of the instinctive and intuitive faculties breaks down in examining their resemblances, and, if we are not convinced at once that they are one and the same thing in their wonderful common insurgence, reassertion after repression and ultimate union as advanced motives and guides to conduct, when their subordination to conscious reason has been effected; then the case for their essential difference at bottom becomes strongly reinforced, when the necessity arises to take note of other and more fundamental characteristics, which prove their separate origin.

They are in fact provably different faculties of human intelligence, drawing their source from opposite features in human nature, pulling our mental selves apart into divided counsels and vacillating courses and creating within us a mental duality, which is with difficulty overcome by reason.

Among the prominent differences between instinct and intuition the first and foremost is, that one is obviously animal in its nature, while the other seems to have no parallel in creatures that cannot speak. Since dogs and monkeys have cerebral hemispheres, they may have their counterparts to intuition, but we have no evidence. On the other hand, instinctive behaviour is quite as characteristic of animals as it is of men and the recent popularity of instinct generally with many people may arise from this cause.

So much do our thoughts and reflections depend upon words and the comparisons between our reciprocal mental states, which they facilitate, that perhaps it is fair to say that advanced intuition at any rate is conditioned, like the intellect, by language, writing, communications of various kinds, perhaps by art and tradition.

At any rate self-knowledge is held to be a privilege of the human race. Self-knowledge is a complicated subject of study, to which I will return at greater length [1] on account of its crucial importance to the problem we are studying, but I will only say here that it implies a definite duality of mental character which is not to be found in the pure reason. Our double nature, partially instinctive, partly rational and reflective, would be merely going forward in courses more vacillating than that of the weakest of us, if it were not for the power of self-criticism. When our instinctive impulses and our intuitive judgments come before the criticism of reason, as in all our important actions they fortunately do, we are able to judge of their causes and their effects, as would an outside critic, and in a way that no dog, no horse, no monkey, nor learned pig would be able to do for itself.

As St. Augustine eloquently wrote in describing his famous dream in the garden of Pontitianus at Milan: 'But thou, O Lord, while he was speaking, didst turn me round upon myself, taking me from behind my back . . . and setting me before my face,' [2] we are, in effect, under enlightening inspiration or revelation, under the influence of great emotion, in the hour of danger or sudden stress, able to view our whole case, bad, indifferent, foolish, wilful, sullenly obstinate, patiently enduring or actively efficient, in such wise that, whether for action or for sober judgment, we can adopt an impulse or reverse a decision or tolerate an undeserved injury, as if we were specially empowered to govern the fate of another man. By this great gift of self-knowledge, unparalleled in the universe within our ken, we can use our instincts and we can test our intuitions, without being the servant of either the one or the other. Can we believe this to be within the power of a single intelligence?

A different version may be made of such a double situation,

[1] See Chapter XVI.

[2] *Confessions*, VIII, 120.

wherein instinct and intuition may be represented as finding themselves rather obviously face to face. How is it that a man can discover the heaven-sent force to hold his hand, as the wretched duellist did in Robert Browning's 'Clive'? Is it not his intuition of eternity arresting the fatal urge of his self-preserving instinct? Let me suggest an even more common case, already mentioned, when we have the instinct come over us to trust to our intuition in a difficult passage of life or we have the lower instinct to distrust reason and reflection and to let ourselves go upon some course of doubtful passion.

Conspicuous also in its tendency to a diverging outlook is the widely different orientation of all instinctive impulses and intuitive presentations in the sphere of action. Instinct is a mode of intelligence directed toward an extreme rapidity and efficiency in acting. Intuition is a mode of intelligence occupied in disregarding both time and executive quality, as compared with the recondite questions of right or wrong, exactness or looseness, logical sequence or chance correspondence. In an individual whose will is undeveloped the double pull of motive becomes alarming in its defects. We see hesitation and rashness alternately guiding the policy of Charles the Bold or of our own Richard II, neither of them foolish men nor incapable of decisive action. What has been described in history as the vacillation of reason is rather to be attributed to a double personality not sufficiently united to secure either effectiveness or wise policy.

In matters of pure understanding intuition has all the characteristics of the conscious intellect. It is interested in purely intangible results and, if it disregards time, it is also independent of feeling. Instinct, on the other hand, has an affective tendency so strong, that for long it was and often now is identified with emotion. There is a very particular reason for its accompanying characteristics of sentiment and emotion, because it is physically allied with all the machinery of sensation. The large body of physiological evidence which confirms this peculiar situation will be examined in its place.[1]

Suffice it to say, that intuition carries on its work in isolation from the affective self, which is the more wonderful to realize when we consider that during its extra-conscious processes it has generally a larger store of emotional memories to draw upon than all the mass of cognitive records. It is less emotional even than intellect. In conscious reasoning we may be inclined, as Turgeniev said of the Russians, to add two and two together sometimes so magnificently as almost to make five, or to elect a man as professor on account of his eloquence and his good table manners; but the unconscious intuition is more to be trusted.

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[1] See Chapters XVIII and XIX.

When the intuitive faculty is set to work upon a problem, we cannot be sure of its producing a result, but we can rely upon the result, if and when presented, being correct on the given material [1] and even upon our finding that sometimes, through its command of memory, corrections have been made in the facts furnished to it. With regard to all emotion intuition seems by itself to be remotely cold, but in this respect I believe it possible that the intuitive faculty draws on rarefied emotions of its own, which have no sympathy with the more sanguine and demonstrative emotions of instinct and consciousness.

Instinctive processes, on the other hand, are emotional in character to such a degree that the intelligent quality implicit in them is often obscured. They are sometimes rather self-centred, and in other aspects they are conspicuously sympathetic. They are thus easily the vehicle of telepathy. In fact they exhibit a character of facile genial altruism, prepared to benefit other companion instinctive faculties, wherever no sacrifice to themselves is involved.

The type of character which is thus genially impulsive and yields naturally to kindly instincts is well known and prevails in any democracy, so long as the masses of the people remain in a good temper. Psychological crowds need to be well fed and amused. They are easily swayed by suggestion. They are subject to emotional gusts of feeling and sentimental sympathy which do not go very deep. They furnish national movements for popular historians and are now passing into sociological textbooks under the heading of the 'general soul'.

The active emotions and childlike intelligence, which are the common property of crowds, is nothing more than instinct. It is the same instinct that we can recognize in ourselves under introspection. Because it furnishes a common psychological ground for large numbers of people, its power in a collective sense is very great. Feelings are swiftly communicated by instinctive sympathy, which would take a long time to travel, if dependent on the intellect.

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[1] The word 'given' is used expressly in a kind of naked literalness, and not in any philosophical or technical sense. A case passing into the intuitive care of any of us is governed by our ignorances, by our slacknesses and by many of our mistakes. The only mistakes that can be corrected are those where our hidden or lost memory has more accurate details in reserve than any that we have preserved in consciousness.

Instinct has a form of intelligence of its own, but it is of a low order. It is probably not incorrect to speak of a 'group mind', as a reality and not as a rhetorical assumption. It is psychologically certain that strong feelings and especially moral sentiments are readily communicable from one individual to another without signs of any kind, and it is possible that embryo mental facts may float over from one mind to another in the shape of half-ideas and half-sentiments in the same way.

If there be a 'group mind', it is not the mind of which any but a very simple individual would boast. It would be an instinctive mind, like that of a well-fed and lazy optimist. It would have nothing but such economic ideas as would commend themselves to a foolish form of good nature. Every one should have enough and more than enough. Work and effort should be abolished. There should be no struggle and no pain. Evil and death should pass away. We should all live for ever and ever with our fathers and mothers and grandparents and children and grandchildren and so on and so on. There are many political speeches which hardly seem to promise less than that.

Political speeches have to be directed at the instincts and at the noblest instincts. They are most often correctly designed to avoid any kind of thought which leads to a conclusion—I do not say to an accurate conclusion, but to any conclusion. Orators must leave all anticipations, all sketches of an ideal world, all logic floating in the air. They are addressing a form of intelligence which is not wanting in facile acuteness, but one which is easily tired, which is as old as the beginning of the world and as callow as a boy before he goes to school.

The feelings accompanying instinct are as fresh as those of a good child. The instinctive intelligence that controls the feelings is unsophisticated and impatient of experience. Indignation is thus easily aroused by disappointment. Suspicions are near the mental surface. Passion flies out angrily at all and sundry who oppose any obstacle to an immediate millennium. The cruelties of a crowd are righteous and sentimental cruelties, due, as Spinoza would say, to the prevalence of inadequate ideas.

It is astonishing how stable is this form of instinctive intelligence. In educated people it sinks downwards or inwards below the threshold of consciousness or outside of it, but it is not easily discouraged and never slain. It can only be slowly modified by habit and discipline. Experience does not necessarily change it. In old age it rises again to the surface and returns to consciousness equipped with knowledge, carrying the old iron-hard certainty into policy and possibly combining cunning with its uncompromising convictions. The feelings that have accompanied instinct, without belonging to it, are withered and shrunk with the weakened nervous system, which was formerly their too facile instrument of expression. Advanced instincts have often become selfish, disillusioned, spoilt by indulgence or embittered by suffering. How many lives do we not know ending under the dominion of the same instincts as those under which they were born! Their lives have given all the evidences of energetic activity, but it has been gyroscopic motion and not progress.

The smaller group of characters, where reason has established an abiding reign and has been fortified by intuition, offer, however, a deep problem under introspection. They, too, have their instincts. No one has been born without them. They belong to men who have yielded early and steadily to the greatest of all instincts, the prompting to use the intellect and its superior ally. They have passed into the small circle of the wise. Yet their instincts are seldom dead, only tamed and suitably blended to form a steadfast will, consolidated by healthy habit and inspired by the ideal features of character. How far do these favoured ones act by instinct, by reason, by desire or by intuition?

We shall never know. Neither the method of observation nor that of introspection will reveal the full truth to others or ourselves. If the observed subject become some day famous, a biographer will gather all the available data and found his generalizations on some amalgam of his own selections. But the instincts and the intuitions will be inextricably entangled, as indeed they are in real life. The system of intercommunication within the capital headquarters of life is ample, rapid and perfect, so that infinite counter-modifications are possible up to the moment of decision in action.

Is there any clue to the means used in setting our two faculties in motion? Yes; they are conspicuously different in the two cases. Instinct is aroused by an external stimulus; or, as Professor Sherrington would more correctly say, by the dominant complex among many stimuli. The resultant group of victorious impulses is replied to by appropriate response, whether that response is offered by unit-instinct or by general instinctive behaviour or by the general attitude of the whole personality, which is determined by advanced instinct.

Intuition appears to be conspicuously independent of outside influences. It is set in motion by inward pressure. It brings the answer to an inward call of distress. It probably cannot work at all while its instrument in the everyday brain is employed for any conscious operation. There are only two possible agents which have the right to call intuition into action and how their appeals are answered we do not clearly know. Either the tired reason in a roundabout way surrenders its prerogative to its superior partner or the impatient instinctive faculty may excite intuition into activity by some sting or imperative irritation.

We are at any rate certain that instinct need not be consciously fed. It is full of its own initiative. It is expectant of external attack. It lies nearer to the centre of our active personality than anything else we know. It has roots deep down in our animal and energetic nature from which it draws its promptness and crude self-confidence.

On the other hand, authority[1] on the working of advanced intuition suggests that previous work is indispensable to provide the material factor necessary for intuitive activity. It must be supplied with facts and stimulated by previous reasoning and encouraged by a certain attitude of humility on the part of the conscious intellect. In the case of simple or metaphysical intuition we have little to go upon except that the surrender of the self appears to be necessary in order to open the way to the spectacle or vision of eternal truth.

Equally indistinct are the preliminary facts surrounding the exercise of perceptual intuition, but the gathering evidence seems to show that it is far from being a simple process. The intuitive faculty in perception carries intuitive pattern-material within its cognizance, patterns that enable it instantaneously to assimilate only relevant sensory-material. The cerebral organization provides memory in the form of a perceptual pattern, applying it unconsciously to the objects that are immediately given. Sensory messages are co-ordinated by the special and other sense organs, which have been disciplined by evolutionary processes and perceive what they are taught to observe.

We have here conspicuously a case where we cannot rely entirely upon introspection. If perception is a cerebral function, depending on intuitional or extra-conscious activity of the cortex, as there is reason to suppose is the case, it is necessary to bear in mind that the material for perception, the sensa or sensations afforded by objects, are not cerebral presentations. The presentations themselves mostly come by a longer route from non-cerebral organs. To find out what sensory material is and by what path it arrives will be a subject for further study, partly outlined in Chapter X and examined in detail in Chapters XVII and XVIII. It is a subject that cannot be elucidated without reference from the evidence of introspection, or 'mind to body' argument, to the reverse induction drawn from the 'body to mind' argument.

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[1] Descartes and others; *vide supra*.

Suffice it to say, at the present stage, that sensations with very few exceptions do not appear first in the cortex, and are therefore not presented by the rational or the intuitive faculties. Sensations or sensa mostly come from below, through the main channels and junctions of the thalamic region. It is therefore clear that, if they are not instinctive presentations, there is no doubt that they come physically from a region where they may be held to be liable to instinctive influences. To determine the exact course of sensibility and of most sensations, by which impulses and objects are presented in consciousness, constitutes the greatest of all the problems which concern the 'body side' of mind. We cannot clearly say at present that the extra-conscious side of perception comes definitely within the province of either intuition or instinct.

The differences between the regular exercise of the two faculties of instinct and intuition seem to me far to outweigh the value of any inferences as to their identity which we are entitled to draw from their resemblances. Only one broad fact helps in any way to support the hypothesis of their identity. Both faculties begin their operations in extra-consciousness and return for their advanced activities to the same sphere of extra-conscious independence. To this one and unsupported coincidence in function is to be related all the features of their resemblance and evidently it is a circumstance which does not compel us to assume identity.

Much more important circumstances point to a fundamental difference between them. Instinct is far the more powerful and original factor of the two. Instinct controls the exercise of reason, which is the close relation of intuition, or, if that kind of affinity is not admitted, at any rate the two latter are obvious working partners. Through the reason instinct probably indirectly actuates intuition and if, at times, instinct accepts guidance from intuition, as it also does from reason, the act of submission appears to be wholly voluntary in both cases.

It seems clear that the instinctive faculty only accepts with difficulty what can be called control from reason. Deference perhaps and temporary submission are conceded with some restiveness. During full consciousness reason acquires gradual and habitual acquiescence from instinct, but complete supremacy of reason is rare. Whereas the position of the intuitive faculty is almost subordinate to reason from the start. It seems to act as the highly valued expert or the attendant physician. Its counsel is far from being always accepted or trusted. To many downright people intuition is a non-existent faculty during a large part of life in all higher aspects. If the help or warnings of intuition are neglected, its working partner, the intellect, seems to be able to get on very well without it.

The conclusion remains inevitable that the two faculties of instinct and intuition have no identity. I have no hesitation in accepting that result as a fact. It appears to me to be clear from the introspective side of the case. The physiological arguments will tend to confirm the same conclusion. It is impossible to suppose that the vast machinery of sensation and sensibility, which are intimately allied with the working of the instinctive faculty, are also responsible for the more delicate and elusive unconscious operations of intuition.

If there were no separate organs to be found for the two faculties, the case might perhaps have been more doubtful. We might have been forced to recognize the difficulty of accounting for the necessary exercise of two intelligent faculties in the human system. As it is, the evidence from structure and from the lessons of comparative anatomy place no insuperable obstacles in our way. The physical side of the argument is an aid and not a hindrance. We are not compelled in the interests of a fanciful introspective and psychological theory to re-arrange any functions of the upper and lower brain nor to reconstruct nor split up the known machinery of human sensation.

A large body of physiological evidence is ready to hand, waiting to be sifted for our purpose. Recent investigations have brought concrete results within our reach. There is no necessity to fall back on Hartmann's mystery of the Unconscious Self. Nor have we to look to anything like reflex action in order to presume a seat for the instinctive faculty of intelligence. Nor are we driven to assume that the kind of intelligence for which we have to find a place is a wholly hypothetical extra-conscious form of intelligence, of which we can find no traces in our organism.

There is actually a known seat of conscious intelligence where the instinctive faculty resides and carries on independent activities, about which a great deal of information is already available. It is able to fulfil its separate functions and to maintain close co-operation with the joint faculties of the intellect and intuition by a marvellous system of communicating fibres, securing the most intimate relations between the region of the thalamus and mid-brain and the cortex of the cerebral hemispheres.

Finally, in the upper brain, we have the already-known machinery of the cerebral convolutions, the admitted seat of the memory and of the intellectual intelligence, available at once for the conscious operations of reason and the extra-conscious activities of the intuitive faculty.

The bulk of the evidence to be sifted is so great that the search must be carried on in gradual stages. In Chapter X and again later in Chapters XVII, XVIII, and XIX some attempt will be made to trace the paths of sensation to their collecting and organizing centre, and to show that at the very spot where the assembling of all the constituent elements of feeling and all the materials for cognitive faculties takes place, there are to be found a small group of highly differentiated organs with characteristic functions, of which it is too early to treat even in the most summary manner.[1]

Sir Henry Head, in his *Studies in Neurology*, is the first scientific researcher to draw public attention to the special intricacies of these organs. He is practically the discoverer of their special significance. He has not, however, claimed for them all that will be proved, I believe, of their future outstanding influence. His discoveries will give an immense impetus, not only to the study of the physiology of the brain, but also in direct ways will react on fresh interpretations of psychology and stir up unthought-of depths in philosophy. A great light must be thrown on the powers of instinctive motives by our deeper comprehension of the organs through which they are exercised.

The physical features, to which I specially refer, are the collection and final junction of nearly all sensory messages and cognitive elements in one narrow locality at the base of the brain, where many of them are relayed to a small nucleus of grey matter, which is an end-organ for many important purposes of sensation. In the same region and at several similar points all outgoing messages to the upper brain are assembled and possibly selected before transmission to the cortex of the cerebral hemispheres. Similarly some sensory and many other messages are received from the cortex in return. In a compact region of highly specialized organs there is an unheard-of concentration of important up-and-down cerebral business which needs our most profound attention.

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[1] Diagrams illustrating the physical situation are attached to later chapters.

The crucial facts are hard to separate from a mass of detail. I am not yet venturing to analyse the separate features of this crowded locality nor to describe the paths of conduction, which accommodate upward and downward messages, except to remark that there are no channels leading both ways. I am trying for the moment to disentangle the logical significance of the great Head discoveries and to sum up their effects. Unquestionably the greatest consequence comes to confirm the conclusions of the present chapter, in establishing the existence of special organs for instinctive activities and, as a concomitant fact, leaving the cerebrum free for the operations of the intellect and of the intuitive faculty.

To the physiological problem immense further interest attaches, especially for mental students. The chief points group themselves round two conspicuous circumstances.

(1) The existence of an end-organ with the possibilities of independent intelligence in a small mass of grey matter composed of similar tissue to that of the cerebral cortex. It is in an entirely separate locality from that of the cerebral hemispheres.

(2) The existence of an assembling centre, to be described and illustrated later, which is more or less concerned with three separate functions:

   (*a*) It receives and relays all sensory and cognitive elements.

   (*b*) It transmits a selection of them to the independent intelligent centre and assists in relaying the rest to the cerebral cortex.

   (*c*) It receives all the returning messages from the cortex.

The end-organ will be found in the medial nucleus of the optic thalamus and the collecting centre lies in a group of intercalated cells in the ventral nucleus of the thalamus at the point where all sensory messages congregate, before some of them pass to the end-organ of the thalamus, while others are transmitted to the cerebral cortex. This little group is personified by Head as the 'intercalated cell' and perhaps its real importance is too great to be exaggerated. It lies close to the point also where the returning messages appear on their way back from the cerebrum, an intimate relationship, which may, too, have its significance.

About the highly-concentrated stream of mental traffic much mystery and uncertainty still prevails. It will be noted above that I do not venture to say that the 'intercalated cell' fulfils any definite function, such as intercepting, relaying, selecting or transmitting impulses, but merely that it is concerned with and perhaps assists in a scheme of distribution of sensory messages, whose complexity baffles imagination.

How the sorting out of traffic in the congested centre is accomplished it is impossible to say. The task of the active] agency, whether it be a group of cells or not, is probably that of an overworked secretary, occupied all day long with a rush of transactions, of which he can be only fragmentarily conscious. The important fact, as far as the 'intercalated cell' is concerned, is its situation in the thalamus and the possibility of its being obliged or permitted to take part in a very delicate function of selection among grades of sensory impulses.

More seriously vital still are the condition, the functions and the indirect influence on life and conduct of the independent end-organ, situated in the medial nucleus of the optic thalamus. There is no question of its immense sensory importance. It assimilates all the work of the spinal cord and the medulla oblongata of what is called the bulbo-spinal system. In the opinion of many it effects a great deal more. Its duties as an end-organ are much more than sensory. It is probably a cognitive organ and a seat of conscious and extra-conscious intelligence, with capacities that are most likely limited, but with powers of which we do not really know the extreme range. It is the home of the instinctive faculty.

Let me return to the point where we had been led by the arguments drawn from introspection as to the existence of two independent intelligent faculties, those called instinct and intuition. The intuitive faculty undoubtedly resides in the higher brain. We had to look for a separate seat for the instinctive faculty. I may say more. We had to find it. It must be found, or the whole system of inferences from conduct, from perception and from reflection would vanish into thin air. Clearly we were in a very dangerous logical situation, one which before now has been responsible for a whole series of mad and metaphysical fancy-bred castles and of dangerous philosophical speculations.

I will venture to confess that I had been convinced by the logic of inferences from the Head researches and owing to Head's discovery, as it seemed to me, of the intercalated cell, that another centre of human intelligence existed in the human body, that it would be found to act in a spasmodic manner, mainly in extra-conscious ways, and that it would not show a high quality of intelligence, when the mental value of its operation could be analysed and appraised. I believed in the existence of something like an instinctive intelligence, even before I recognized the traces of its operation in instinctive behaviour.

I knew that there was in human nature an effective mental duality, based probably on a duality of intelligence. I expected that the natural differences of instinct and intuition would give me the key to it by introspection from the side of consciousness. But the inception of my argument, in spite of its apparently psychological origin and character, has been from body to mind and not from mind to body.

Such a logical situation is probably in order and correct. No proof is more than plausible from a single one-sided induction. No proof is impeccable, even when an argument is advanced with success from both sides. But between alternatives the stronger case is certainly that which can be more firmly founded on the evidence of structure, of phylogenetic history and of unconscious performance by agencies which do not come under the influence of the will. I believe that the 'body to mind' argument for the existence and activity of human instinct is stronger than that which we are entitled to draw from introspection.

CHAPTER IX

DEFINITIONS OF INSTINCT AND INTUITION

UP to the present Instinct and Intuition have been presented as approximately equal and parallel features in human life. The intention was to facilitate their contrast and comparison with the ultimate purpose of deciding once for all whether they are either names for the same thing or two different states, conditions or forms of the same faculty. Now that both enquiries have been decided in the negative, it becomes clear that instinct and intuition will fall further apart. They will arouse our future interest in diverse ways and may more usefully be considered separately. We must oppose them in order to define them.

In the first place the real opposite number to instinct is not so much intuition as the intellect. Intuition is an aid to reason, whether predominantly an antecedent condition or an auxiliary and spiritual partner it is hard to say. Without reason or the intellect intuition altogether lacks individuality, initiative or the power to assert itself within the personality against the more dominating influence of instinct. The highest tribute that can be paid to intuition is that it may represent or embody a superior quality of intelligence than reason, both in degree and in kind. Although there is ample and eloquent authority for placing intuition on a sublime level, I hardly venture to say more than that I believe it to be true. I do not think it is proved or can be proved.

While reason and intuition each and together may rightly claim a very great superiority in the cognitive and reflective capacities to the parallel equipment of instinct, regarded in its function as an organ of intelligence, yet, even both together, they cannot rival its assertive and vigorous efficiency. When they appear, mutually supporting one another, as rivals of instinct for the control over some primitive and undeveloped personality, they can hardly expect to carry the day. They do not and they show it.

In the second place, instinct and intuition have a widely different orientation. Instinct is aimed unequivocally at action. Intuition is an instrument for arriving at the truth. Perhaps that is why it seems to have rather a provisional existence.

The best work of both is effected in extra-consciousness. As we have ascertained in the last chapter, their unconscious source and operation is the sole cause of all those features which they appear to have in common. Coming slowly into consciousness, they are very variously manifest in mixed states according to differences in individual character and subject to personal differences in the power of introspection. Sooner or later one or other will appear fully in consciousness, presenting quite well-known states of mind that are difficult to explain or define, but of which most people are certain that they have a first-hand, self-evident and intuitional form of knowledge.

In consciousness all intelligent faculties become subject to reason or the conscious operation of the intellect, situated as we know in the cortex of the cerebral hemispheres. All auxiliary intelligent faculties also appear to be merged in the reason during full consciousness, though we can detect the work of the instinctive and intuitive faculties being dissolved out of it during semi-conscious, half-waking or highly emotional states.

Reason stands for the completeness of consciousness. We can never, humanly speaking, be sure that the state of consciousness is complete or remains long complete. Reveries break in upon it. Casual stimuli and outside suggestions set to work the automatic action of half-begun inward tendencies. Waves of emotion submerge the watchfulness of pure reason and inhibit thought activities. Even action only promotes complete unity for a moment. For action, as Blondel explains, closes one chapter only to open another. Action starts consequences which bring a train of new suggestions. From a fresh direction a general assault begins by the multiple forces of external stimuli, such as the central reason was not expecting or had forgotten.

Throughout all this turmoil and unrestingly during its ceaseless, continuous, apparently futile mentality the practical side of the personality asserts through instinct the necessity of living, and prepares extra-consciously all the apparatus for material well-being, including a more or less complete scheme of inclinations with obstinate orientations for possibly short-sighted designs.

The scheme of inclinations includes a bundle of crude desires in embryo, which resemble an armour and panoply of discontents, of restless urgings, of impatient and furtive suggestions for oblique and indirect satsfaction. These desires take the form of 'a push, not a pull', as Mr. Bertrand Russell writes.[1] It is not until it appears in consciousness, that a desire shows itself as a gap in the scheme of content or happiness and identifies itself with a value of certain specific objects, which may or not fill the gap.[2]

In animals the complete unity of instinct within itself is brought about by the efficient and immediate co-ordination of three things: (1) a general restlessness; (2) a specific orientation of all restless feelings towards a physical spot in the body—leg, wing, webbed foot—resulting in something like an itch or burning, which continued attention to the affection will increase; (3) a surprised consciousness of a relation between the specific organ and a particular feature of the environment. Thus a leg will or may give a kicking blow at an intruder. A wing may flutter and beat the air tentatively. A webbed foot will splash at the water and begin paddling in the shallows before it takes a duckling out into the pond or stream.

In human beings instinct acts less specifically. Hunger and thirst rarely give us trouble, because provision anticipates any need for them. We have, however, our burning spots with remote and gradual indications of the actions towards which they tend.

Although we have fewer incentives to direct action, we possibly have a larger number of general instincts, of which I select illustrations for three principal cases: (1) the tongue, especially in eloquent races like the Irish or Gascon, is, as they say, loosely hung and prompt to persuasion, reprobation or general oratory; (2) the restless wandering imagination of a Scotsman will start him enquiring about the price of a ticket to London; (3) the mind of a philosopher, who can find no one to listen to him, turns to paper, ink and the catalogues of libraries.

In this way the peculiar human proclivities are shown of: (1) speech; (2) travel; (3) thought and reflection. All three are advanced instincts, being complex of many units of restlessness and show desire for general development and progressive self-education, leading on to prospects of social advancement and mental cultivation. It is doubtful whether much has been gained in recent years by over-emphasizing the tendency to analyse human instinct and to split it up into unit-instincts, resembling those of animals.

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[1] *Analysis of Mind*, p. 68.

[2] See my *Psychological Theory of Value*, Chapter I and *passim*. The essential feature of my theory of value amounted to this: (1) that objects had no essential, intrinsic value; (2) that some objects were chosen instinctively to fill primary needs; (3) that most objects were chosen, because they promised remotely or seemed likely to fill gaps in an artificially constructed scheme of life, according to standards of living and comfort, whose origins and plans were to be traced backward invariably to advanced instincts.

No doubt it is a tempting field of enquiry and lends itself to brilliant illustration, but, since the scientific current has been setting strongly in that direction, we have been led away from instead of approaching nearer to the true explanation of instinct, that it is a mode of intelligence with a definite seat among human organs. By accentuating analogies between ourselves and creatures with organs different from our own, we have lost sight of the difficult track leading to a comprehensive solution. Animal instincts have indeed been best developed among insects, where all resemblance in significant structure has been out of the question.

Allowing for differences, which perhaps exceed in importance any real trace of affinity, we can see some analogy between the first dive of Lloyd Morgan's famous moorhen and the way an ambitious boy will spend his first coin on an illustrated technical paper.[1] Both take instinctive first steps without foreseeing all the result, but the one is a specific and the other a general act of intelligence. The latter has a far wider scope and significance.

In one of its aspects instinct amounts to an instantaneous recognition of relationship between instrument and occasion, between opportunity and inclination, between equipment and environment. The appearance of inclination foreshadows the completion of the work of instinct and the birth of desire. When a desire passes into the condition of becoming conscious of its end, it loses the special characteristic which has been usually associated with the essence of instinctive behaviour.

Reason cannot exert its influence on instinct until the primary inclination has left the obscurity of extra-conscious operation and come into the open. Reason asserts its sway by pitting the strength of one instinct against that of another. Reason can only rule with difficulty among the warring elements, many of them possibly equal to it in rude strength. If it tries simple tactics and trusts to prudence and foresight to keep passion under control, it will probably fail. More wisely perhaps it will preserve order by weaving stratagems and by constructing advanced instincts, which are highly complex compounds of natural inclination.

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[1] *Habit and Instinct*, p. 64, and *Instinct and Experience*, p. 4.

The activity of instinct without reason is simpler than one would expect in those animals, such as dogs and monkeys, which are provided like ourselves with a cerebral cortex and the thalamic organization. Owing to the smaller brain and probably to inferior thalamo-cortical communications, they do not seem to have attained self-consciousness nor self-knowledge. In spite of the misgivings of the behaviourist school we are to suppose that the higher animals have consciousness of a kind which has immense differences in degree from reason. But how it differs from it in kind, except by the absence of self-knowledge, it would be difficult to state in plain terms.

As a matter of introspection the great difficulty is to ascertain how far the intelligence of instinct acts within consciousness. Referring to the specific organ of instinct in man, there is no physical obstacle to the play of instinctive intelligence in the optic thalamus side by side with that of the reasoning faculty in the higher brain. It is only the intuitive faculty that cannot function simultaneously with reason, because apparently they use the same organ of the cortex. All the internal introspective evidence seems to show that by far the greater part of intelligent instinctive activity takes place outside conscious observation. Only its results appear in consciousness.

It is generally accepted that in animals there is imperfect knowledge and only vague consciousness of instincts. Some animals, deprived of the cerebral cortex, have self-preservative and self-righting instincts, but the evidence is not conclusive. We may believe them to have thoughts or cortical mental operations, but there is little positive ground for the inference. One slender piece of evidence about dogs comes from Germany, where experiments have been made with animals and the cinematograph. It is said that a cat will recognize its fellow image, but that a dog will take no notice. Unless one assumes that a dog is far behind the cat in cognitive power, this seems to prove that a dog, relying by preference on its sense of smell, will not accept the appearance without the appropriate odour. Since smell is the only cortical sense, the distinction goes some way to suggest a real cortical mental operation on the part of a dog. The presumptions of thought in animals, that are often brought forward, do not amount to more than reading our own mental processes into their inferior methods of response to stimulus.

It is not possible to bring forward any clear case in man of conscious instinctive or thalamic thinking, but there is no impossibility in its occurrence. Indications of thought lying close to thalamic affective processes, such as irritability or emotional excitability, are very common. Further consideration of this particular difficulty will appear in Chapter XII on the duality of thought and feeling.

In any serious claim to reasoning capacity the instinctive faculty is clearly overmatched by the conscious intellect. In extra-conscious activity it does not resign its claims. It may even hold its own with the intuitive faculty during active unconscious thinking hours, when the brain is not consciously employed. It is almost certain that they both act within us during sleep, as the intuitive faculty unquestionably does. Religious and emotional struggles may often thus be fought out by methods which it is impossible for us to disentangle. Some of the possibilities are discussed in Chapter XV on dreams.

What has often been held to be the chief difficulty about instinct in man is still not cleared up. What is the relation between the emotional life of an individual and his instinct? Instincts and emotions have been freely confused. An instinctive feeling is a phrase quite as often in use as an instinctive opinion. Are these two terms interchangeable, or separately valid, or is one or other untenable?

Instinct is a mode of intelligence and its function is to act in judgment on sensations and to pronounce on their merit and validity. But admittedly it is a comparatively low order of intelligence. It is easily influenced by the contagion of an insistent feeling or by the force of a complex of stimuli. The term instinctive feeling is a misnomer and can only mean an instinctive opinion or firm conviction that certain compound stimuli with a resultant confused feeling represent for the moment the temporary but true interests of the self. An instinctive activity charged with feeling is an expression slightly nearer the truth, but it leaves us in the dark as to what instinct itself may be.

The term, an instinct, so far as the word can be legitimately used at all, may equally be applied to a single act of instinct. That would not be one of those 'unit-instincts', discussed in Chapter III, but rather a practical judgment as to a single complex resultant feeling, compounded of immediate stimuli at any moment. For this purpose the term, instinctive opinion, implying an instinctive and collective judgment on a series of instinctive situations, is perhaps a better expression.

The close relation of instincts with feelings is probably due to physical causes, owing to the proximity of the instinctive organ to our sensory apparatus. Sensations coming into the brain system tumble over one another at a central point near the seat of instinct. We must defer the further elucidation of these entangling relations until the next chapter, which will deal with the physical side of the problem. Meanwhile the results of introspection may be summed up in a definition or description.

Instinct is a mode of intelligence common to men and animals. It tends to take very different forms according to the general development of the species or sex or class of individuals in which it is demonstrated. It is conditioned both specially and generally by environment. It varies particularly according to whether it is or is not supplemented by higher modes of intelligence subsisting in the same class. To some extent in man its expression varies according to the intellectual attainments of each individual. Yet there is a general tendency, specific in animals, for all members of the same sex in the same species and class to act in the same way under the impulses of instinct, when they are subjected to the same kind of stimulus under similar circumstances.

The orientation of instinctive impulses is always towards action. The preparation for action takes place extra-consciously in man at certain ages or periods, when the necessity for that kind of action in his usual environment has usually appeared in the past history of his race. The result of the instinctive intelligent preparation shows itself in consciousness at the last convenient moment before the necessity of its application, so as to minimize the chance of interference in action by other modes of intelligence in the same individual.

In man the seat of the instinctive intelligence, which is the source and spring of activity of the instinctive faculty, lies in the basal ganglia of the brain, probably in the medial nucleus of the optic thalamus at the nearest possible situation to the point where information from the special and other senses can arrive centrally, with the natural effect that the appropriate method of response can be and is co-ordinated and applied with the least possible delay. A very generally similar physical organization is traceable in different degrees throughout the species of mammals and vertebrates. But there are critical differences according to the degree of development in each species.

The general aim of the extra-conscious instinctive intelligence is directed remotely to the well-being of the race and species and more immediately to the special benefit of the individual physical system. The interests involved are often divergent, and more often so in the higher than in the lower species, owing to the greater latitude of purpose developed in the superior organization. Both individual and general interests are interpreted by the instinctive intelligence in a comparatively elementary fashion with regard to attack, defence, nutrition and preservation of the race. The central aim of the conscious instinctive faculty is to apply in effective specific action the results of all the extra-conscious general preparation for well-being. The instinctive faculty endeavours also to refine and perfect the general methods of action by the use on occasion of all higher modes of intelligence. The use of the superior intelligence on occasion implies also the power of disuse on occasion and inferentially of neglect.

The tendency to use and the inclination to cease using or even to inhibit the superior powers of the intellect are due to separate instinctive propensities of a very different order of quality. The appeal to the power of reason involves the very highest development of the instinctive faculty. It is a disinterested self-surrender. Refusal to use the cerebral intelligence argues consciousness of self-sufficiency in the instinctive faculty, and arises either from crude ignorance or else from distrust of the practical capacity or of the immediacy in response of the deliberation of the higher brain.

Action is the decisive factor in personality. In man it can only be exercised for all important purposes through the motor system, whose impulses are directed in the cortex of the cerebral hemispheres. Frequent enquiry, response, and possibly some form of consultation or even reconciliation of diverse impulses may therefore take place by means of the communicating machinery between the thalamus and the cortex.

An occasional obscure struggle no doubt takes place internally, which possibly resembles the intellectual crisis on another mental plane. Are we not semi-consciously aware that the reason itself frequently feels at a loss and unable to grapple with a supreme problem? Just as there comes a mental surrender to the superior quality of intelligence exercised extra-consciously by the faculty of intuition, so may there be less obviously a reluctant appeal from the unconscious instinct to the greater wisdom of the intellect in consciousness.

Intuition, which lies, so to speak, on the other side of reason from instinct, is not to be regarded as a rival to the latter, nor a master nor even an insubordinate servant. It may possibly hardly be in contact with instinct at all, even when the two are acting extra-consciously at the same time. Yet it is probable, and it is certainly possible, that during hours of sleep or quiescence the extra-conscious action of the instinctive faculty in the thalamus may well be in contact with the extra-conscious intuitive operation of the cerebral cortex by means of the upward thalamo-cortical and the downward cortico-thalamic fibres.

Between the two reason has often to thwart and even to control instinct, but it rarely has to oppose intuition. It receives the primitive inspirations, the presentations of simple perception and the logical solutions of advanced intuition ready-made, but there is not and there cannot be any conference between the two, since they are both separate functions of the same cerebral organ.

Intuition has naturally and unconsciously the same orientation as reason consciously has towards the pure truth. It has greater power of concentration in that direction than reason, because it is less disturbed by new stimuli. It is free from practical bias in a way that reason is not. It can therefore be trusted to think out problems indifferently, impartially and with relentless logic, to resist interested solutions of personal difficulties and finally to segregate itself from all limited points of view. Its aim is truth and philosophic value in the same sense that the purpose and pursuit of instinct are various forms of practical and economic value.

Intuition can be defined as a mode of intelligence unconsciously exercised by man only among the animals. Its nature cannot be ascertained by introspection nor by examination of its processes, which are in their earlier, longer and more important stages wholly extra-conscious. From its very brief later stages it may certainly be pronounced to be solely a mental operation in a sense in which perhaps instinct with its close affective relations may not be. In both stages our knowledge of intuition must chiefly be obtained by inference from its results, which are presented like those of instinct in a complete form to consciousness.

The seat of the intelligent intuitive faculty is certainly the cerebral cortex. On that account it has peculiarly intimate relations with memory, which will be specially examined in Chapter XIII. It is doubtful whether true intuition can ever be considered as acting in consciousness. There are dreamy states and states of passive allowance of apparently unmotived and unassociated presentation, where, as Dr. Jung states, passive thinking takes place. These may possibly be assigned to the intuitive rather than to the reasoning faculty. Introspection also shows us the results of intuition held consciously in solution during reasoning processes, which may be called belief or religious faith or unreasoning confidence, as in the certain assurance against all the evidence that a friend, whom we know well, is incapable of having acted wrongly or meanly. This may be considered to be, not mere instinctive and partial prejudice, but a true intuitive inference from his character.

It is not necessary to draw the line here very strictly. The results of intuition could hardly be available to us consciously, if they were not carried over to the reasoning intellect in some isolated capsule of semi-conscious firm adherence to conviction or principle.

In its dealings with the intuitive faculty, if I am allowed to use a metaphor implying a certain measure of independence on both sides, the intellect may perhaps be originally an automatic recipient from intuition of fundamental and so-called self-evident truths and of first-hand perceptions, but later it will obtain further help from intuition only after a more or less roundabout method of asking for it.

Reason has to be energetic in pursuing its own course and to provide all the material for logical conclusions. We may almost expand the figure and suppose that reason has to fish for assistance and lay down intellectual ground bait to attract its elusive coadjutor. Reason has to put forth its utmost endeavour and to recognize its own deficiencies and need of help.[1]

The next stage of intuition resembles the unconscious process when instinct is about to emerge into consciousness and to become desire. In both cases the great symptom is a preliminary restlessness, indicating a general want. The restless brain, however, does not positively suffer in any specific direction. The reason goes about into divers places, seeking help and finding none. Usually, if the effort in preparation has been sustained, if the attitude of mind and will be correct and humble, and if mental health be sufficient, some order in the confused scheme of thought will appear, and perhaps unexpected assistance and enlightenment will be afforded extra-consciously by the intuitive faculty, the source of which will for ever remain a mystery, as to whether it has come from without or from within.

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[1] I believe that my friend, M. Jacques Chevalier, has in his *Vie de Descartes* (pp. 191–2) made this point quite clear in comparing that great man with 'un pur intuitif', like Pascal.

CHAPTER X

PHYSICAL ORGANS OF INSTINCT AND INTUITION

INTROSPECTION has probably now shown us all that can be ascertained about instinct and intuition in the research prosecuted from mind to body. It remains to be seen what light can be obtained in the reverse direction in arguing from bodily equipment to mind. Before we go any further it may be as well to recognize that nothing in our nerves or white matter or cerebral grey matter will ever help us to understand the difference between feeling and thought. As far as our physical organization is concerned, the sensory and cognitive systems are one and the same. If we wish to understand more about the vital difference between desire and perception or any other psychological duality, we must again resort to the method of introspection.

For the present thought has to be assumed as a special kind of feeling. Beyond the general fact that we think a great deal in our heads and feel more than a little, while we think very little, if at all, in our bowels, or fingers, or toes, and undergo a great deal of sensation which has its origin there, we must be content in neglecting any special localization of either one or the other at this stage.

The important distinction, which is emphasized in the study of human mental mechanism, is the gulf that separates the sensory-cognitive system from the motor system. It is a division from which flow decisive consequences in the relation between instinctive activities on the one side and intellectual and intuitive initiative on the other.

Another word of explanation is needed as to the large part of our general nervous mechanism which in this present research must be taken for granted. I hope I am avoiding part of the general error of Hartmann,[1] who in his creation of an unconscious 'self' lumped together every kind of automatic visceral action, every toe and eyelid reflex and all the motional and vasomotor expressions to combine with the far more influential mental phenomena, in order to make an unmanageable whole, which had no unity nor individuality of any kind. What will be taken for granted in the present text is the whole bulbo-spinal nervous sensory mechanism, whose realm encloses roughly everything below the neck in our bodies, and a good deal of the outgoing effector system, all the motor system, in fact, beyond the first cerebral impulses leading down to the pyramidal tract on the way to the spine.

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[1] *Philosophy of the Unconscious.*

What we shall have to consider carefully are the relations between the brain-proper, the system of the cortex cerebri, where the intellectual and intuitive faculties are concentrated, and the hitherto comparatively neglected small region above the spinal cord and the medulla oblongata, where we are told that instinctive activities have free play. The region of the sub-cortical centres includes the mid-brain and optic thalamus and several smaller bodies lying near to the thalamus, such as the corpus striatum[1] and various pseudo-thalamic bodies, whose functions are still partly undetermined. They are not exactly within the thalamus proper, but many of them bear thalamic names, such as metathalamus, epithalamus and hypothalamus.[2]

Two groups of these in particular must be specified on account of the special part which some of them play in the sense of sight, the four corpora quadrigemina, and the two external and two internal geniculate bodies.[1] Through the external geniculate bodies pass from 70 per cent. to 80 per cent. of the optic fibres. Partly for this reason and partly also for convenience of frequent reference I propose, in writing of the optic thalamus, to drop the word optic from this usual name, and call it for the future generally only the thalamus.

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[1] It is of course regrettable to have to bring in an unnecessary organ amid the confusion of technical terms, so some apology is required for mentioning the 'corpus striatum' and then dropping it completely out of consideration. But the corpus striatum is a body which shares thalamic functions in a mysterious way. Very little is known exactly about it, but its intimate connection with the thalamus is shown by the large number of fibres passing from the optic thalamus to the corpus striatum. On the other hand, there are very few fibres passing from the corpus striatum to the cortex. No inference can be drawn at present from this circumstance, which must, however, have a great importance which will justify research.

[2] According to Gray's *Anatomy*, p. 793, etc.: The mid-brain, or mesencephalon (A), must be distinguished from the thalamencephalon (B), and the telencephalon (C).

(A) includes (*a*) the cerebral peduncles (2); (*b*) the corpora quadrigemina (4); and (*c*) the cerebral aqueduct.

(B) includes the thalamus (2); the metathalamus or corpora geniculata (4); and the epithalamus, containing the trigonum habenulae, the pineal body and the posterior commissure.

(C) includes (*a*) the cerebral hemispheres (2); (*b*) the pars optica hypothalami.

The thalamus proper is a small ovoid body composed of two equal halves, one on each side of the brain in the centre, connected by a commissure or uniting group of fibres. One half is apparently the duplicate of the other. They are referred to conveniently as one, one representing the other as if it were the whole individual body. Each half is divided, small though it be, into several nuclei, which again come to be subdivided according to function. Here I begin to get into difficulties, as the nomenclature of the small parts does not seem to me to be stable, while their functions, connections, and 'cortical projections' [2] are of immense importance to my argument. I have tried to follow the admirable descriptions given by Sir John Parsons.

The subject is immense and from the physiological side deserves close study in the original authorities. It is impossible to give more than a brief sketch here of the essential points required for stating the mental case. In the present chapter only one half of the question is examined in order to draw attention to the duality that is involved in the rival centres of the thalamus and the cerebral cortex.[3] In later chapters, XVII, XVIII, and XIX, the physiological evidence will be studied afresh, mainly from the opposite point of view, in order to ascertain what mechanism exists for reconciling this natural duality and for co-ordinating both sections of the divided mental system in a single united personality.

The central point of the sub-cortical region is the thalamus, which fulfils two important central functions for the whole body. It acts as an end-organ in that section, which is called the medial nucleus, for some of the sensations coming from all over the body and may be also there the centre of the conclusions or final mental operations of the instinctive activity. It also acts in another section, called the ventral nucleus, as a relaying station for all sensory messages passing from the spinal cord and body before they go to the cortex.

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[1] Parsons, *Perception*, p. 124.

[2] 'Cortical projections' means 'provided with fibres leading direct to the cerebral cortex'.

[3] It is perhaps necessary to say here that the particular duality, discussed in the text under the title of 'mental duality', does not refer to the duplication of cerebral or thalamic organs.

As Sir Henry Head describes them, all afferent impulses in the spinal cord and brain-stem pass up in three main divisions: (1) Sensations of pain, heat and cold. (2) Sensations of postural recognition and discrimination of heat and cold. (3) Sensations of contact sensibility. These sensory paths reach their final termination in the optic thalamus.[1] Here lie the synaptic junctions or relaying stations, where incoming messages of sensation are redistributed and forwarded on to the cortex of the cerebral hemispheres. After the regrouping I understand that 'the sensory impulses travel from the thalamus to the cortex in five groups: (1) Elements of posture, etc. (2) Certain tactile elements. (3) Elements of close tactile discrimination, such as sensations of touch made in experiment with the points of the compass. (4) Localization capacity. (5) Groups of thermal impulses.'[2]

After this close analysis Sir Henry Head, writing in conjunction with Dr. Holmes, reaches the following impressive conclusion: 'We believe that there are two masses of grey matter, or sensory centres, in which afferent impulses *end* to evoke that psychical state called a sensation. One of these is situated in the *optic thalamus*, whilst the other . . . is the cortex. . . . The thalamus is extremely complex and contains not only the terminal centre for certain aspects of sensation, but plays a threefold part . . . in sensory impulses.'

'(1) It contains the termination of all sensory paths; here sensory impulses are grouped afresh and redistributed in two directions: (*a*) to the cortex; (*b*) to the grey matter of the optic thalamus.'

'(2) It contains a mass of grey matter, the essential organ of the thalamus, which forms the centre for certain fundamental elements of sensation.'

'(3) The lateral part of the thalamus is the organ through which the cortex can influence the *essential thalamic centre*, controlling and checking its activity. The excessive response to affective stimuli . . . is not due to irritation but to removal of cortical control.'[3]

Of the many points involved here, all of them important in the analysis of mental control, four are relatively prominent. Two of them will be dealt with in the present chapter and two more will be considered at greater length later on. For the moment I wish to insist most of all on the first: the remarkable revelation that there are two end-organs for sensation, in which comprehensive term the possibility of thought or judgment of some kind may be provisionally included. The two end-organs are the cortex of the cerebral hemisphere and the essential organ of the thalamus, the medial nucleus; more probably and exactly, as we shall see later, one of three smaller subsections of the latter. The second point is only less vitally critical in mental study on account of the overwhelming importance of the first; it concerns the grouping and relaying of nearly all sensory messages in the thalamus, this time in the ventral nucleus, where in many cases their passage can be specifically traced.

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[1] *Studies in Neurology*, Part II, pp. 540, 549.

[2] *Ibid.*, Part II, p. 596.

[3] *Ibid.*, p. 597.

While it is only necessary to examine the above two questions at the present stage of the argument, there are two others of weighty significance, which may be mentioned now and relegated for consideration to a later chapter, because their study bears on a different point in the argument. The third concerns the possible capacity for feeling and even thought possessed by the medial nucleus of the thalamus or old thalamus, as it is sometimes called. The fourth subject for detailed examination regards the special vital machinery whereby the close relations with the cortex are maintained, including especially the 'intercalated cell', on which Sir Henry Head has laid some stress.

It is perhaps a little difficult to justify in principle the splitting up of several questions which are obviously in close relation to one another. It seems like needless fussing over factitious distinctions. Several reasons, however, make it almost compulsory. The bulk and intricacy of the material prevent it being all analysed at once. It is equally impossible to postpone any longer some examination of the cranial organs involved in our discovery of new principles. I have adopted the division of the subject from a very definite point of view. In the present chapter I lay stress on those facts which tend to establish a mental duality. In the next few chapters I discuss at length the psychological aspects of mental duality. At the end of Part II in Chapters XVII, XVIII, and XIX I try to bring the unity of mind once more to the front and accentuate those physical features of rapid intercommunication, such as Head mentions above in his third point, which enable us to maintain the substantial identity of the self in spite of local diversities.

The remarkable facts revealed by the Head discoveries have not aroused much attention from the psychological point of view, although their bearing on the physiological side of sensation have attracted weighty comment and some criticism from M. Henri Piéron in France, from Professor Herrick in America and from Sir John Parsons. The minor inferences from their publication have been freely discussed, and some denied, but, so far as I know, no one has estimated how much influence their discoveries of the functions and initiative of the thalamus have or ought to have on mental theory and philosophy.

The minor conclusions are themselves weighty enough. Roughly the effect of the Head investigations carried out by elaborate experiment tended to divide sensation into two broad classes, of which one, the coarser and deeper variety, called protopathic or dyscritic, seems to come home to the thalamus and leave its final effects there. Other finer and more delicate sensations, called epicritic, are relayed to the cortex through the most elaborate kind of machinery. There are finer differentiations, which seem to me less important.

Sir John Parsons in another direction has pursued the same line as the Head investigations, has confirmed them and carried them further. M. Piéron has criticized them without grasping their importance. Mr. Herrick seems to acknowledge the authority due to them without much comment on their inferences. On the question of differentiation of sensibility alone, which he has considerably refined by his studies in comparative anatomy, Parsons has probably expressed the right view in stating that, though the separation of dyscritic and epicritic sensation is due to Head and Rivers, the distinction rests on surer grounds than they put forward.[1]

On the higher value of the major conclusions to be drawn, Parsons says little or nothing. Those on which I wish to insist for the present are as follows: (1) The vast importance of realizing that we have an organ in the thalamus, which is undoubtedly an end-organ for certain purposes, whose secondary function it is to sift out all sensory messages, or nearly all, before they are relayed to the higher brain; (2) that this organ in its selection, whether conscious or not, keeps to itself what we may call the heavy-weight charges and sends on to the cortex all the lighter material of sensation; (3) that the one special sense, whose message is not relayed to the cortex, is the peculiar one of smell.

In the result all odours reach our consciousness with that particular emphasis which sometimes lacks refinement and yet is capable of very special discrimination. In this exceptional case sensations seem to lie close to the emotions and have a remarkable effect on memory. The details of this exception I will discuss later, when I trace the remarkably confused path of smell sensations to the brain and thalamus. It presents a unique case of reverse progress of sensory impulses in offering its results primarily to the more famous organ and only incidentally to the thalamus as a blind alley.

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[1] *Perception*, p. 74.

This exceptional treatment of smell has been mentioned by Woodworth and Sir Arthur Keith without special emphasis, it is detailed by Foster and Sherrington and illustrated by Paton. In none of these authorities, however, has any special attempt been made to draw any inferences from the peculiar privilege which odour has, of being the only cortical sense, cortical, so to speak, without any modification elsewhere, nor has anyone dwelt on the consequences which this anatomical fact might have on psychology.

No comment has yet been made on the significance of a watchdog or Cerberus keeping the door of the brain against nearly all our sensations. No question has yet been raised as to what it may imply. No explanation has been given as to how the protopathic system has been selected for discharge into the end-organ of the thalamus, although the facts are now very nearly established. No hypothesis has been put forward as to what power or intelligence has distinguished the finer epicritic sensations so that these only are relayed to the cortex. No one has suggested a difficulty as to where that deciding authority may be situated.

It seems to me that some application of logic may be used to exhaust the possible alternatives open to afford an explanation of a curious and one might almost say an intriguing arrangement. Either the sensations are selected by a superior intelligence or select themselves in the minor receptive centres, as if their selection resembled a reflex action. For instance, the cortex may call for some of them, as the more important sensations, in contrast to others in which it takes no interest. Or the selection takes place in or near some end-organ, constituted of material similar to that of the cortex, which is situated close to the synaptic junctions where all the sorting out takes place.

The evidence points to the supremacy of the thalamus. It is difficult to suppose that the nerves receiving the sensation of a prick or stab in the fleshy part of the thigh should have the power to insist on the destination of their messages, whether they should go to Cæsar or appear before a minor tribunal. It is equally difficult to suppose that the cortex, without special machinery or any direct connections, could know better than the nerves or their junctions what was going on, in time to insist on the immediate reference of any special case to itself.

The latter conclusion would a few years ago have seemed the only one possible, but any theory of the kind held now is strictly incompatible with the obvious deductions from the case of smell. The supremacy of the cortex cannot be taken for granted. On any theory of sorting out the senses based on first choice by the higher brain, it is strange to realize that only odour has the cortical preference, while the elements of pain, touch, sight, hearing, balance and taste are relayed elsewhere before any selection of them can come to the cerebral hemispheres.

Suppose we were to say carelessly that all the selection had been already done by nature and fixed in us by our nervous and mental machinery, it would only be putting the difficulty one stage further off, without solving the problem or offering any helpful suggestion. It is not a metaphysical cause beyond intelligence that we seek. Intelligence is an explanation that is not easily brought in and it is still more difficult to justify in detail. Yet in the long run it is less difficult than any other and it has this supreme advantage that intelligent explanations of perplexing situations are winning victories all along the line. All explanations that run counter to intelligence are being slowly beaten in detail.

If the operation of selection were to take place within reach of interference of the cortex, we might and probably should assume some degree of control. We might go further and accept the operation of the cortex, either in or out of consciousness, as being the instrumental cause of the peculiar phenomenon involved in the automatic discrimination between two groups of sensations.

But situated where it is, the cortex is both far away from the actual seat of division and by its immense complications, its vast number of cells and its comparative slowness of decision it certainly has every local disadvantage in controlling an operation which requires decision even more emphatically than delicacy. The higher brain has a lesser claim to determine the course of the stream of sensation than the seat of the ruder faculty of instinctive intelligence.

We have necessarily to conclude that the function of discrimination between at least two classes of sensory material, which involve not only pain and what we colloquially term feelings, but also delicate elements of visual and auditory perception, must be an operation of intelligence and perhaps something more. To decide that a whole group of deep feelings are vital and of immediate importance, while another group is held to require deliberate treatment and more careful classification, is a central act of intelligence. It is importing something resembling will into the business of distributing the elements of sensation.

In comparing the thalamus and the cortex as natural instruments, as end-organs for certain purposes in human beings, we find the same material construction and very similar fibres of communication. The thalamus is smaller than the cerebral hemispheres, but contrary to general opinion it is more differentiated.[1] Its position is more central. It is in direct touch with a greater number of subsidiary bodies.

If the thalamus be an organ of intelligence, as well as an end-organ for sensory elements, as by general agreement of progressive researchers it is acknowledged to be, it will offer a seat in the human brain corresponding exactly to the functions which from introspection we have concluded to be those exercised in man by the faculty of instinct. It is physically suited to be the guide and controller of the affective system, receiving all primitive and vital currents of sensation, while dismissing elsewhere those sensations which demand finer treatment. It offers by analogy with the construction of the cortex and its grey matter what we should expect to find in a seat of strong but limited intelligence.

Suppose the argument to be inverted; suppose that we are not looking for a seat of intelligence, where operations of vital import and infinite delicacy are being continually performed in the name of instinct. Shall we not have to allow, in the name of sensibility, the existence at the base of the brain of an independent intelligence working separately from the cortex? Should we not ask what it would be likely to do and what influence it would probably exert on our usual psychological processes? Would it not behave in many ways as we know that the faculty of instinct constantly does?

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[1] Perhaps at first sight this statement may appear to be paradoxical. But in order to realize its truth we have only to reflect that in the large area of cortical blanket consisting of millions of plastic cells, the essence of its characteristic power lies in the virgin identity of its component parts. The cells are to begin with substantially homogeneous and have similar communications. The organs of the lower brain and the nuclei of the thalamus are essentially heterogeneous and have deftly varied communications on a purposive system, both with one another and with their neighbouring ally, subordinate or superior, as it may be. No one yet knows which parts of the thalamus are merely intermediate in function and which have directive power.

We should expect to find a strong, rough, overworked but decisive intelligence. We should expect to find it self-sufficient as a rule, but accustomed to allow delicate and difficult points of fact and of judgment to be determined elsewhere, except when it was disturbed in its normal equilibrium by a gust of feeling or an emotional storm. We should not be surprised to find its machinery of sensation so organized as to give itself the least possible trouble about ornamental details or fanciful discriminations. We must often find it a victim to its own crude judgments, to obvious sentiment and to short-sighted and narrow views. Under these circumstances it will interfere with the ordinary routine of sensibility; it will act decisively on inadequate knowledge; and it will not hesitate to sacrifice longer views and purposes in the apparent interest of efficient and immediate action.

With all these propensities we must remember that it can never be again entirely free. It has an ally or two allies, superior in many important respects, to whom it is attached by cords of sympathy and long-established co-operation. It is in many substantial ways the servant of the vast and highly intelligent system which it has certainly helped to create.

About some of the material and decisive facts which bear on the case there is now very little manner of doubt. In earlier chapters I have already referred to the particular statement of Sir John Parsons: 'that the mid-brain and optic thalamus form together the chief correlation centre for cutaneous sensory, gravistatic and photostatic impulses.'[1] A gravely-enunciated contention of this weight amply bears out the general conclusions on which I have laid so much stress. It is in the thalamic junction and nowhere else that the central function of relaying and regrouping sensations is carried on. In continuing in the same sentence, that 'the optic thalamus is the supreme centre for dyscritic and instinctive reactions', Parsons goes far to confirm the further views of Head and Holmes that the thalamus is an end-organ for primitive sensations, which is to my mind far more critically significant than the other point.

There is a further contention, for which I am responsible here, that an element of intelligence cannot be excluded from these passive and active operations. Some faculty operating in the thalamus acts as agent, or as something perhaps rather more than instrument, in exercising a power of either choice for itself among sensations or a more general and more disinterested duty of selection among all the vast material of sensory and cognitive individual impulses. For the most difficult among many daring hypotheses confirmatory evidence is not altogether lacking.

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[1] *Perception*, p. 94.

Sir John Parsons elsewhere writes about the primary psychological material on the cognitive side that 'the thalamic region in normal man may be regarded as the "formative zone" for all cutaneous sensations'.[1] It is quite possible that I am inclined to read too much into his expression 'formative', when I hold that any intelligent action is thereby implied in the thalamus itself. The words, however, can mean nothing else than the belief that, if a formative or selective intelligence is operating at all, we know that the process must be carried on here, at the very point where the results occur. Either the cortical intelligence or, alternatively, an instinctive intelligence acts as a selector at the thalamic junction, or else no intelligence acts at all and the supremely important process of discriminating and separating sensations into critical groups must take place of itself. But, if so, how?

Various other authorities, particularly the most recent, confirm and even reinforce these views as to the importance of the thalamus. In C. J. Herrick's *Introduction to Neurology*[2] the thalamic mechanism is regarded as old and in particular the medial nucleus, often called old on account of its phylogenetic ancestry in animals, is said to have a special place in comparative physiology. Probably in the lower vertebrates without the cerebral cortex the protection it afforded was adequate. Dr. Herrick's view is that it still retains in man certain primitive functions and perhaps conscious activities. In other words, the activity of the cerebral cortex is not held to be essential for all conscious processes, although its participation is necessary for other, particularly for all intellectual and voluntary activities.

In J. D. Lickley's *Nervous System*[3] the thalamus is described as a great terminal nucleus for the sensory fibres ascending from the spinal cord and the hinder parts of the brain. It receives fibres from the cerebral cortex and sends others back upwards in four great groups or stalks, which are not described in five groups according to their functions, as by Head, but according to the part of the cortex to which they ascend: namely the frontal, occipital, temporal and parietal lobes.

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[1] *Perception*, p. 73.
[2] P. 290.
[3] Pp. 63–4.

In J. P. Morat's *Physiology of the Nervous System*[1] the thalamus is regarded as the chief centre of a particular system, to a certain degree independent of the cortico-bulbar system with which it is analogous, though more simple. . . . Its connections with the cortex are numerous; yet it may act independently.

In Paton's *Human Physiology*[2] the thalamus is described as being the locality where the ingoing fibres from the body receptors are brought into close association with those from the distance receptors of the head, the eye and the ear, while in this region there is some evidence that stimulation is associated with crude modification of consciousness.

In Halliburton's *Textbook on Physiology*[3] the thalamic region is mentioned as the point where the process of sorting of the impulses destined for the cerebrum is completed. 'Here we have not only sorting and grouping, but also facilitation of some and repression of others; in fact a struggle for dominance.'

While all these authorities come near to ascribing special powers to the thalamic region, including perhaps even consciousness, the last may serve me as a text. It is a good example of scientific language, which cannot help using terms that imply character and personification, yet always throws such initiative back on the smallest possible organs or instruments. In the above text the personified impulses, nerves or fibres are represented in a struggle for mastery. I prefer to personify, not metaphorically but literally, the thalamic end-organ, giving it a status and attributes of the same order as the cortex. In this analogy there is the following vital difference between the two personified powers, for which there is ample evidence. In the thalamic grey matter the instinctive intelligence is elementary and undeveloped, while the affective accompaniments are numerous and powerful. In the cortical convolutions of grey matter the intellectual capacity is very high, while the affective element is weak.

Dr. Herrick mentions consciousness as one of the possibilities of the individual thalamus. I do not predicate this, as I regard it as an open question; possible, perhaps probable, but by no means certain. It is safer, for the present at any rate, to presume that consciousness is essentially a capacity of the organism as a whole, rather than a faculty claimed severally by any of its parts. Yet I feel convinced that the thalamus is an organ of intelligence with

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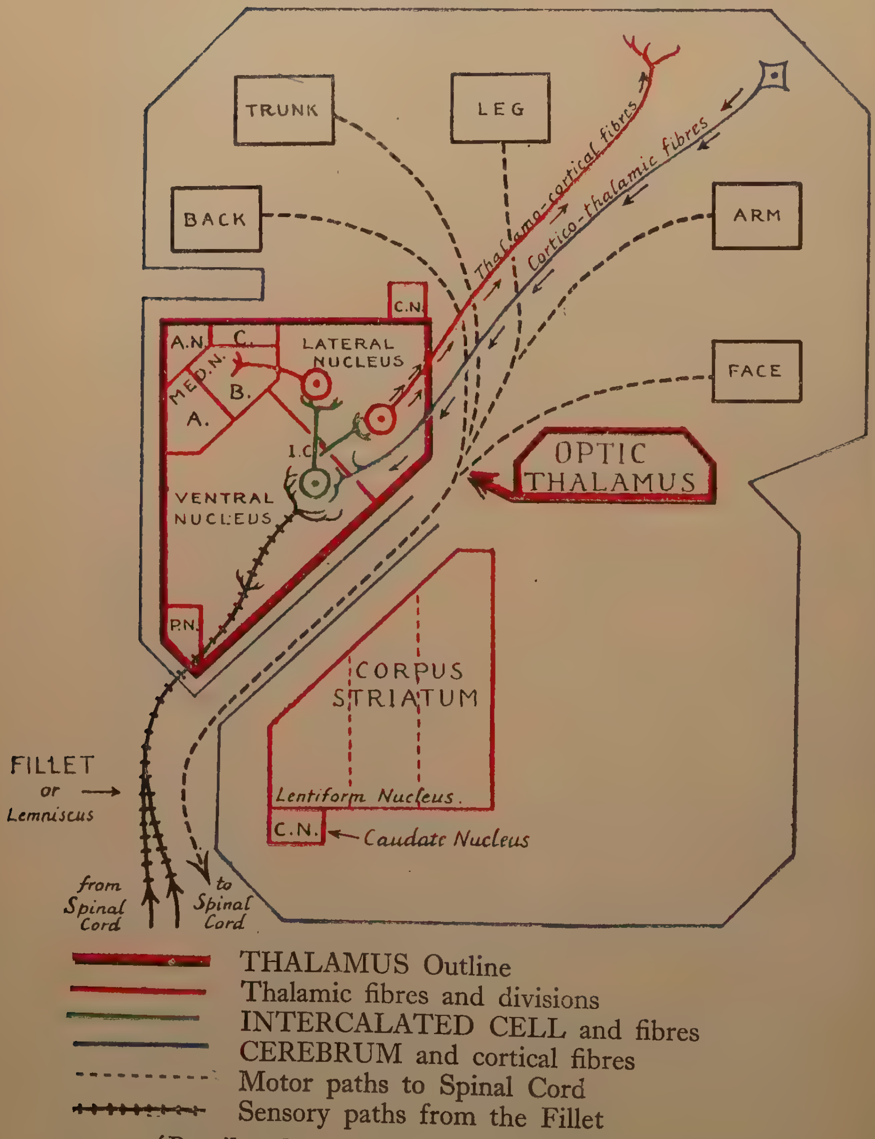
[1] P. 414.

[2] P. 119.

[3] P. 744.

FIGURE I. A DIAGRAM OF THE TRANSVERSE SECTION
OF THE
RIGHT CEREBRAL HEMISPHERE
[vertical cross section]



(*Details taken from Head, Foster and Sherrington*)

LEGEND

MED.N = *Medial Nucleus* of THALAMUS.
A. B. C. = Three sections of Medial Nucleus.
A.N. = Anterior Nucleus of Thalamus.
P.N. = Posterior Nucleus of Thalamus.
Lateral Nucleus is differentiated out of Ventral Nucleus.
Latticed Layer is outer edge of Lateral Nucleus.
Ventral Nucleus is receptor of most sense-impressions.

Thalamo-Cortical fibres take messages upwards.
Cortico-Thalamic fibres take messages downwards.

INTERCALATED CELL (marked I.C.) is the central junction for all sensation. *It represents* a *group of cells*, where all sensory messages are relayed before passing on either to the *Cortex* of the CEREBRUM or to the *Medial Nucleus* of the THALAMUS.

Motor Areas have their own series of descending paths using the large pyramidal cells and sending messages down to the spine and limbs over the Motor or *Pyramidal Tract*.

The functions of the *Corpus Striatum* are little known. It has two nuclei—the Lentiform and Caudate Nuclei. The latter nucleus is long and passes in a curve (not shown) from top to bottom round the Thalamus.

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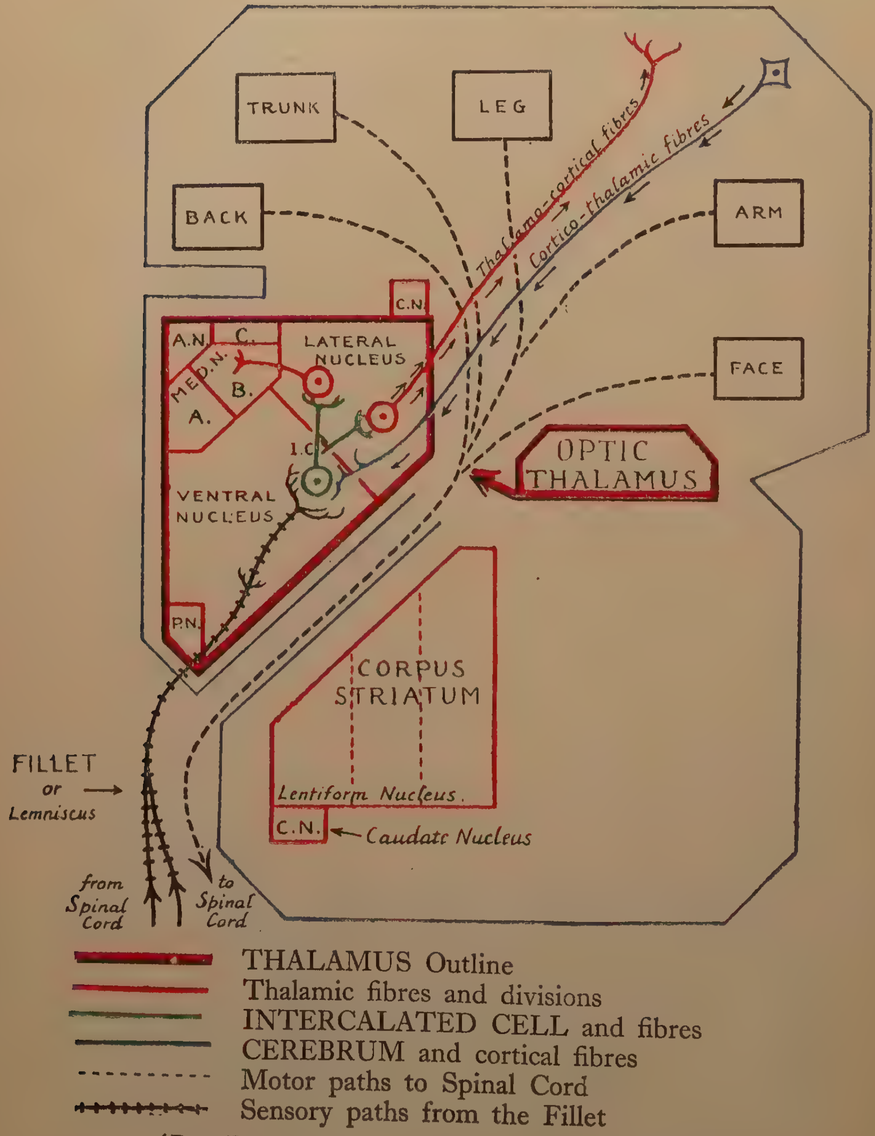

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a very old phylogenetic history. Its influence has been great in past human development and not necessarily diminished at the present time. Its intelligent faculty of instinct, supplemented by the later co-operation of a higher intelligence in the cortex, has led man up, stage by stage, from the lower organization of the earlier animals and has played a selective part in the evolution of his mental and bodily equipment.

It is more than probable that the form of intelligence belonging to the instinctive faculty was formerly exercised independently of consciousness and may continue to be so on many occasions. It was used before any consciousness existed, as we can imagine it. It has been continuously used both without and with consciousness. In man, even, to-day its operation mostly takes place extra-consciously and we are seldom, if ever, bothered with our sensations until they have passed decisively into the thalamic or cortical regions respectively. I am of opinion also, although I can see little direct evidence for it, that an appreciable amount of instinctive or thalamic thinking takes place in our consciousness, which we find it very difficult to disentangle from the more straightforward mental processes, for which the cerebral cortex is responsible.

The point at which I have arrived is the definite acceptance of two distinct organs of intelligence in human beings, the thalamus, which is the seat of instinct, and the cerebral cortex, which is the seat of the allied faculties of intellect and intuition. All the implications of this duality will be a difficult matter to follow up. They will be dealt with in later chapters, mainly by the method of introspection.

There now appear three consequent issues, asking for some kind of immediate solution, which I will name in the order of their importance: (1) What are the relations and the methods of communication between the cortex and the thalamus? (2) What are the relations of both to sensation and feeling? (3) What are the relations of both to the motor system of the body?

The first problem runs evenly and equally throughout the whole of the present work. It is not altogether tantamount to the enquiry into the relations between instinct and intuition, but it covers the same ground. The second also cannot be confined to the limits of one discussion, but it will occupy the greater part of Chapter XII, where its chief implications will be carefully examined. The third question is mainly a matter of mechanism, which can be dealt with shortly at once.

The control of the motor mechanism of the body is concentrated in the cerebral cortex, and its localization of origin has been determined with fair accuracy. Foster and Sherrington give the localities, as roughly indicated in the accompanying diagram (Fig. I) of the transverse section of the right cortical hemisphere. The apparently originating points of these impulses all lie in the grey matter of the cerebral cortex.

The cortex of the two hemispheres of the human brain, unlike the optic thalamus and its region, has been profoundly studied since ancient times. The cells of its grey matter have been counted and are approximately estimated at something round about 10 to 14,000 millions. The external layer of grey matter, containing the all-important cells, resembles the material found in the medial section of the optic thalamus and in the centre of the spine. The arrangement of the spine is, however, different, because the invaluable grey matter is carried, no doubt for greater protection, in the centre of the spinal cord and is wrapped around by the so-called white matter or fibres. In the upper brain the fibres or white matter are below and inside the outer blanket of grey matter, which constitutes the cortex or bark, surrounding the two cerebral hemispheres within the outer protection of the skull.

The cortex itself resembles a crumpled blanket with innumerable folds or convolutions. It is very thin but owing to the deeply crinkled folds its superficial area is comparatively extensive. With the large available surface access is given to very numerous communicating fibres or commissures, leading from one section of the cortex to another. The convolutions receive upward paths and originate other paths, leading downwards to the thalamus and elsewhere. The most important downward groups of paths conduct impulses directly to the motor system. The latter receives its central, and what may be called its considered impulses from cells in the cerebral cortex.

Among the numerous folds a large one, called the central fissure or the fissure of Rolando, traverses each hemisphere from side to centre. On each side of the fissure of Rolando are important cortical areas. The area behind it in each hemisphere, called the somæsthetic area, receives impulses from the body senses, chiefly from the skin and muscles, transmitted through the thalamus. The corresponding area just in front of the same fissure in each hemisphere is called the motor area. The motor area in each hemisphere is connected through the spine with the opposite half of the body muscles; the right brain-globe with the left half of the spinal cord and the left globe with the right side. It is important to note that the communicating fibres pass directly, after crossing, to the spinal cord, so that the motor impulses, unlike the sensory messages, are not relayed in the thalamic region.

The upper part of the motor-impulse path is called the pyramidal tract, from the shape of the very large brain cells in the motor area, usually called pyramid cells. The motor area of the brain has no direct connection with any muscle, but acts through the pyramidal tract on the lower centres in the spinal cord, where the impulses are passed on to the muscles.

The argument from location of paths, and in a larger sense the argument from body to mind, is as follows: (*a*) most of the messages from the special senses, except smell, pass direct to the thalamic junction and are relayed to the cortex; (*b*) the upward bodily messages, transmitted through the spine, are relayed in the thalamus before going to the somæsthetic and other sensory areas in the cortex; (*c*) the downward motor messages start, as far as we know, in the cortical motor area and pass to the muscles after being crossed and transmitted through the spinal cord.

Near the upward sensory path in each half of the lower brain lies in two duplicate halves an end-organ of grey-cell matter concentrated in the medial nucleus of the thalamus, each half being smaller than a nail of the little finger. Each half is estimated to consist of three smaller subsections. Of the inward and intense responsibility herein involved there is probably a more minute concentration in the middle one of the three sections, subsection (*b*) with a bulk about one-third of the medial nucleus of one of the pair of thalami. It is presumed that in this restricted spot the instinctive faculty presides over the passing of the vast bulk of sensory messages, unconscious as well as conscious. We know fairly definitely that a very important process of selection takes place near here, but there is no present agreement as to where the credit or responsibility for the selection is supposed to lie.

On the downward path in each half of the body lies all along the spine a continuous or almost continuous sheath of white medullated fibre surrounding the grey matter or nerve cells. Not at one point but at many points the muscle-messages are retransmitted along the several limbs. There is here no end-organ, no selection process, and the evidence that points to any intelligence being exercised must refer only to executive functions. In the spinal cord and its effectors we have possibly the elements of executive intelligence and of something closely approaching memory.

By way of contrast with the extreme simplicity of the central voluntary motor system, relying on the cortex alone, let me give the briefest possible sketch in three divisions of the complexities of the sensory system.

First: the numerous sensory receptors in the skin, muscles and sense organs of the body, some communicating directly with the thalamic area, but most with the grey-cell matter in the spine, indicate the probable existence of minute embryo reflex units intelligent enough for receptive purposes, accompanied possibly by fragmentary elements of consciousness. An intermediate semi-independent reflex machinery lies in junctions of the limbs and their centralized connections in the spinal cord. The latter have grey-cell matter, which argues the possibility of a slight increase of responsibility and intelligence.

Secondly: a definitely secondary stage appears in the assembling centre for the vast bulk of sensation, which takes place in the ventral nucleus of the thalamus. Ocular, aural and balancing messages follow even more complicated paths. Close to the receiving stations, situated in the medial nucleus of the thalamus, we find the seat of an independent instinctive intelligence, possessed of strong initiative, little deliberative power and unstable consciousness. It is contained in a one-third subsection of the medial nucleus, approximating in size to the smaller end of a collar-stud.

Thirdly: we find the intellectual faculty occupying the well-known cerebral areas, receiving in well-localized and labelled angles the refined elements of sensation. Here we have also the light of reason and generally full consciousness. Behind it in the same area we have the reserve powers of the extra-conscious faculty of intuition.

Except for intuition, all these capacities are brought ordinarily into play for action. The full description of the combined sensory and motor system requires a very important supplementary explanation. Let us call the three efficient instrumental agents A, B, and C, observed in the order of a sensory message announcing the near arrival of a cricket ball, whose destiny in existence is to be used within the fifth of a second as a passive instrument in a boundary hit. A is therefore the sensory system concentrated in the instinctive area of the thalamus; B is the deliberative area of the cerebral cortex; C is the executive area of the motor tract extending from the cortex to the spine and limbs. The course of perception to A is swift. Delay may occur between A and B. Interruptions are less likely to occur between B and C. When

C is in operation, so long as the human machinery is young and in working order, hesitation is no longer possible.

Why, if any delay occur at all, does it generally occur between A and B? Between A and B a very elaborate consulting machinery of thalamo-cortical and cortico-thalamic fibres exists, whereas there are no direct fibres downward from A to C nor upward from C to A. In the first instance close and double-direction lines of communication between thalamus and cortex argue a special validity in their relations. It exists nowhere else in the body and certainly not in the motor section of activity. Hence arises at this point of cleavage an occasional delay, perhaps a mere hesitation, perhaps a vacillating will, in some cases a conflict.

Of definite proof here there is no suggestion. In all inferences from body to mind proof is too far away. But a presumption similar in kind to proof, if different in degree, exists to show that, if we believe, as most people do, that the brain is the seat of the intellectual and intuitive capacities and their exercise, so it is not an extravagant inference to see in the optic thalamus a suitable organ for the instinctive faculty.

As we begin to understand the various implications involved by acknowledging the principle of duality of intelligence, not to speak for the moment of other qualities which must be examined in the following chapters, so we shall recognize that in future the great difficulty which must attend the study of psychology will be parallel and similar to that which interrupts the practical execution of electrical work, the problem of interference.

To begin with, 'interference' will show itself consciously in modifying all sensations that are naturally referable either to the thalamo-protopathic or cortico-epicritic sensitive systems as they come into our consciousness. In the second place, 'interference' will develop itself unmistakably in counter-influences between thalamus and cortex in the special way which is often called by the technical psychological name of 'the Unconscious', and under that title has been inadequately handled.

This problem of interference between thalamo-instinctive impulses on one side and cortico-rational judgments on the other has not yet received its proper consideration, for the simple reason that so far no one has yet imagined the existence of any separate mental power as residing within us and capable of holding its own against the supremacy of reason in consciousness and perhaps with intuition extra-consciously.

Interference, therefore, in the special sense in which I use the word, has never been discussed. The question has not even been raised in the new vista opened up to our knowledge by the wonderful Head discoveries and the invaluable inferences drawn from them. The thalamic region has been vindicated as a seat of important extra-conscious processes, but little work has yet been done in analysing all the new indirect consequences and in pushing them forward to yet bolder inferences.

The statement of the new discoveries has been eminently conservative, perhaps too much so. They are expressed so as to cover as little new ground as possible. It has not even yet been made clearly evident that they fall naturally into two divisions which are not very closely related. Each group of ideas had its own origin and each was founded on a quite distinct assemblage of inferences of first-rate importance.

The earlier investigations by Sir Henry Head were conducted by him in conjunction with Rivers. Head severed a few critical nervous paths in his own hand and arm and the two pioneers in research conferred together over the results for many months. The second body of knowledge was collected and published together by Head and Gordon Holmes from a group of important cases of thalamic injury during the War. Both sets of papers were published together in 1920 in *Studies in Neurology*. In my opinion the two groups of experiments logically lead in two separate directions of rational speculation. The Head-Rivers group definitely tend to establish the two systems of sensibility called (*a*) protopathic and (*b*) epicritic respectively. They have been followed up and confirmed in other ways by Parsons and have been much discussed by other writers and experimenters. The Head-Holmes group of cases raise but do not solve the question of mental duality. There has been no opportunity for following them up. The principle involved in them is more far-reaching and significant than any analysis of sensibility alone; in fact, the former question is in effect included in the latter, logically at any rate. Both points are discussed at greater length later in Chapters XVII and XVIII.

The reader, who should trace out for himself the valuable details in both enquiries, will find how much the inferences were interrupted or perverted by the possibility of interference. The more pregnant issue was raised by the apparent control of thalamic sensation by influences from the upper brain, or as it was technically phrased 'by backstroke from the cortex'. I will only give my impression from reading the evidence in the second group of cases that both investigators seemed to me a little obsessed by the theory that the cortex in matters of sensation had or ought to have something approaching complete control. This predilection appeared particularly in judgments which took the form of suggesting that any exaggeration in pain was due to the removal by injury of cortical control, which tended to modify discomfort and to reduce it to seemly proportions. This was an argument which I could not allow to be either logically correct or even probably consistent with the real state of the facts.

The problem of interference can be better illustrated by concrete cases, of which I venture to suggest two, one quite imaginary and the other historical and authentic. Both have been selected on account of their forms of extreme complexity and in order to provide test cases of extra-conscious influences from the thalamus on the cortex and vice versa. The agents or instruments are presumably the faculties of instinct and intuition respectively.

The first was constructed by me on the basis of a telepathic experiment conducted by Professor Gilbert Murray and a sympathetic interpreter, under conditions which were guaranteed to be free from accidental or interested outside help. Professor Murray concentrated his mind on the murder of Thomas à Becket. His act of constructive imagination or voluntary vision was correctly perceived in the mind of his coadjutor. The case was interesting, because it seemed to me to afford an interpretation which links up telepathy, or feeling at a distance, with telegnosis, or knowing at a distance. The former is thus converted into the latter. Acting on this suggestion I gave above a hypothetical case of reasonable judgment passed consciously on the story of the murder of Becket and judged a second time extra-consciously a week later in the opposite sense by what I called the intuitive faculty. It seems to me arguable that the later decision might equally be due to instinctive influence.

The second case is the far sounder one of Descartes' dream, about which we know a great deal, partly from his own detailed description and partly from the well-known circumstances under which it occurred. I propose to analyse them both introspectively.

In Chapter V I imagined that on a certain November 10 I had been reading Froude's account of the murder of Becket and considered that the historian perhaps took too lenient a view of the assassination, which was in all respects without excuse or palliation. I also passed mentally a summary judgment on Henry II's personal responsibility, saying aloud some such phrase as: 'the king knew very well that some one would take him at his word, when he let his tongue go about the archbishop. I don't see how the king can be morally acquitted.' I think no more about the story in consciousness.

During the week I would be extra-consciously turning over the moral case in my mind with an uneasy feeling that I had not quite solved the whole intricacy of responsibility and that so small an outburst did not deserve the condemnation due to the bloody fulfilment with its attendant horror. On November 15 I had a violent fit of anger at some culpable mistake that occurred at the office in my absence, yet with difficulty repressed an ill-tempered outburst. On the same evening I am rather proud of my self-control and think the whole incident closed without any visible effect.

On November 20 something recalls the murder of Becket and I mention the matter in conversation, when to my surprise, I find myself by an intuitive reversal of judgment rather warmly defending the king from unreasonable blame for the murder. My own suppressed personal emotion has been turned into an instinctive protest against all rebellious and officious subordinates; my interfering instinct has extra-consciously insisted on the intuitive reversal of my former intellectual pronouncement.

The case has the weakness of being constructed to demonstrate the importunate interference occurring naturally where emotion linked with instinct on one side overrides intellectual and perhaps intuitive judgment on the other. The paths of conduction are the numerous fibres running between the lateral nucleus of the thalamus and the various parts or 'gyri' of the cortex. Some fibres, called thalamo-cortical, conduct messages upwards, while others, called cortico-thalamic, bring back other messages in return. It must be remembered that no single fibre conducts impulses both ways; nor do they run haphazard; they seem to follow directions according to very definite plans, as far as they have yet been traced with certainty.

In practice messages seem to be going both ways all the time, since there seems to be no evidence that the traffic can be held up by mere pressure. When inhibitions occur, they appear to be purposive rather than accidental and instinctive rather than intellectual. There seems to be no initiative on the part of intuition and no case of inhibition that anyone could presume to call intuitive.

Since everything except the results takes place extra-consciously, we have to argue backwards from the nature of known mental events, when they are complete. It is only afterwards that we become aware that our judgments are being silently revised by our emotions, or that our feelings are being slowly analysed into quiescence by the cool reflective powers of reason and sometimes of intuition. The processes of modification, whether upwards or downwards, constitute examples of interference. Complicated as they may seem, they are without any doubt simplicity itself compared with the psychical and mental operations that are going on within us all the time.

Every failing of temper is probably an instance of a thalamo-cortical message inhibiting a thought. Every effort of self-control is actuated originally by a quieting reversal of some instinctive thoughtless, hasty impulse conveyed downwards along a cortico-thalamic fibre during some prolonged internal discussion. No act can take place without some kind of working solution being obtained after frequent rehearsals on both sides. Without our submissive acceptance of action-patterns as working hypotheses we could not continue to carry on everyday life with its recurring necessary judgments.

A self-constructed incident is not very hard to analyse. Nor is the thought-reading experiment difficult to understand under one hypothesis; in my opinion feelings, emotions and composite moral sensations are propagated from one individual to another, without signs, far more easily than purely mental events. The latter are tied to their set methods. Strong instinctive waves of crude feeling-thought are accompanied by or charged with emotion. The Becket murder can be psychically outlined vividly in broad emotional strokes following an easily interpreted sequence. It is possible that the extra-conscious communication of the simple and violent murder story is a case of telepathy rather than telegnosis. Similarly I always hold that crowd movements of feeling are matters of instinct and of relations between extra-conscious thalamic feeling-thought and are not due to any intellectual influence transmitted by signs, words or train of reasoning.

The Descartes dream [1] is a far sounder test-case. Fortunately we have about it a very unusual amount of direct and indirect evidence. It depends on two accounts given by himself, of which the more detailed appears in the *Discours*. There are evident in it three noticeable features: (1) an extreme state of mental tension with regard to his philosophy; (2) a minor preoccupation about religious matters, which is typified by his visit to his old school chapel in the Jesuit College of La Flèche; (3) a revelation that he is not to trust to knowledge or mere reason exemplified by a dictionary, but to have recourse to intuition or inspiration, exemplified by the Corpus Poetarum.

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[1] Jacques Chevalier, *Vie de Descartes*, pp. 38–47.

These three strands are not hard to unravel. The first is an intellectual problem; the second suggests rather tamely an emotional element; the third presents an obvious solution, which Descartes quite definitely interprets to be due to intuition and to prove its superlative value.

These are all the factors affecting the result, of which Descartes was himself aware. But we know more of the circumstances than he puts before us. The event happened on November 10, 1619, in the second year of the German Thirty Years War, which had begun without at first showing its religious character. Descartes had enlisted as a soldier of fortune with the Protestant Prince Maurice of Nassau. He was then twenty-three, and, as a free combatant with French political sympathies, he was fighting against the Spaniards. Growing older and attending the coronation of the Emperor Ferdinand II at Frankfort, no doubt the religious aspect of the war began to appeal to him. After his vision he joined the Catholic forces under the Duke of Bavaria, and on November 8, 1620, was present at the battle of Prague, which ruined the cause of the Bohemian Protestants. Three days after the battle and one year and a day after his vision of intuition, he made a great discovery, probably in optics, to which he attached the same kind of importance as he had to his earlier vision.

Such were the general surrounding circumstances of the Descartes vision of November 10, 1619. The immediate and personal circumstances were that he was in a condition of self-control, if not of abstinence, because he had not touched wine for three months. Again he was passing through Ulm on a journey and was shut up all day alone in an inn with a hot stove. His physical conditions thus contributed in him to a state of tension.

His personal struggle had two phases. He was anxious to get peace of mind in order to continue his mental work, which was a case of intellectual stress. He was worried about his share in the great war, which gave him instinctive anxiety mixed with emotional strain. His dream gave him immediate relief in bringing him to some apparent issue on the intellectual side, while later on his choice of the Catholic cause was confirmed by the victory of Prague. The recollection of his dream a year later completed the mental and emotional release from strain and the intuitional work of his brain bore final fruit in his optical discovery. The exact interval of a year and a day must be held to have had some significance, as also his care in recording both of the two dates.

Descartes seems to have been conscious only of his intellectual perplexities, whereas I have no doubt that his emotional and religious stress was an absolute hindrance to his progress on his chosen path until the barrier of 'interference' was removed by a succession of events. All his instinctive activities were wasting themselves in conflict and preventing his intellectual and intuitive faculties from making headway. What he believed to be an intuitive solution was only the first step in the instinctive solution of his double complex. The real intuitive solution came a year later, when his intellectual life was free to begin a fresh course.

The problem of interference embraces the sum of the possibilities of one intelligent activity either blocking the way of the other or again of helping it to a quick solution. The special feature of the phenomenon lies in the close relation between the thalamus and the cortex with their rapidly communicating thalamo-cortical and cortico-thalamic fibres. Such a storm may occur in a second, may last for five minutes or an hour or set up complex opposing groups of forces in advanced instincts, which may take more than a year for a complete solution.

When I come later to describe the inner mechanism of communicating fibres between the parts of the brain, the mental significance of the close relations between the physical organ of instinct and that of intellect and intuition will stand out more clearly. There is to be added to these complications a quite distinct series of problems introduced from the affective system, which is closely allied to instinct, those which we associate with the terms sensation, feeling and emotion.

In whatever way we look at nature we find it full of artificial dualities. These dualities can probably in the end be reduced to a single fundamental duality, which must to some extent be closely allied to the physical basis, whose mechanism has been discussed in the present chapter. The physical basis of duality is to be referred to the separate intelligent systems operating in the thalamic region and in the cortical hemispheres. The thalamic system represents the instinctive faculty on one side and on the other the system of the higher brain represents the joint faculties of reason and intuition.

Overlaid on this duality whose factors are fundamentally allied, because their correspondence is intimate and exactly calculated, are several misleading dualities, which must be separately discussed in the second part of the present work. The most apparent but not the most important is the difference between conscious and extra-conscious mental operations. These functions exhibit, in my opinion, differences in method but not in essence. We have both conscious and extra-conscious thoughts and feelings, both groups of which are mental events of the same character quite apart from the amount of attention we may give to them.

The duality of thought and feeling presents much greater difficulty. It is a real duality which cuts across the physical duality of thalamus and cortex. The exact distinction between feeling and thought is a question which has given trouble to other people besides myself. I am inclined on the whole to think, or perhaps believe, that we possibly have thalamic thoughts as well as thalamic feelings, which are distinguishable from cortical feelings and cortical thoughts. On this point we shall be helped very much by a still more detailed examination of the physical conditions of the whole brain than I have been able to attempt here.

The duality of pleasure-discomfort or pleasure-pain is not easy to unravel for anyone unaccustomed to introspection, but fortunately it is no new subject. Dr. Moore has written clearly about it from the philosophical point of view; the Head experiments have thrown a great deal of light upon it; and Mr. Bertrand Russell has summed up the discussion well in his *Analysis of Mind*.[1] Pain is no longer regarded as exhaustively the opposite of pleasure. Its character is approximately tantamount to the manifestations of what are loosely called the special senses. Some physiologists claim to recognize particular receptors of pain sensation, which are near the various surfaces of the body, but unequally distributed. Pain will take its place ultimately as an important and the chief element in the group of all the dissatisfactions, discomforts and distresses for which we lack a suitable comprehensive name.

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[1] P. 71.

PART II

ANALYSIS OF MENTAL AND PHYSICAL DUALITY

CHAPTER XI

SOME OLDER DUALITIES DISCUSSED

The logical conclusion, which appears as the result of our examination in Part I into the nature of Instinct and Intuition and of our analysis of their respective qualities and functions, clearly points towards a fundamental duality in our human nature. Both the resemblances in and differences between the two faculties offer every evidence that, although their methods of working are very much alike, their origin and their force do not arise from the same source. We have reason to believe that the physical organs by which they operate are, contrary to general belief, entirely separate.

It is important to note, however, that the contrast between instinct and intuition cannot be considered as more than a symptom of an underlying duality. It does not constitute a mental duality in itself. The parallel between the capacities and functions of the two faculties can only be carried a part of the way and it is not in any sense complete.

To begin with, instinct is far more powerful than intuition and appears in many respects to be a controlling faculty sometimes governing the other. Again, instinct clearly operates in extra-conscious ways, but it also acts in the open in full consciousness. Intuition can only act unconsciously, because reason or the intellect fulfils in consciousness the same or similar functions as intuition. Instinct has its seat in the thalamic region, while intuition and reason together alternately operate in the cerebral hemispheres.

The mental duality must therefore be predicated not between instinct and intuition, but between instinct on one side and the partnership of intellect and intuition together on the other. Such a division of functions exactly coincides with the complete system of mental organization in the cerebral hemispheres on one side, as contrasted with the rival organization of the mid-brain and thalamus on the other.

Yet the situation presents even more subtle complications. We have to consider the whole fresh problem of sensations, feelings and emotions, which become deeply tangled with the apparently neat division between cortical and thalamic functions. Instinct is conspicuously allied with feelings and emotions, but not altogether in sole control of them. Intuition has very little to say on matters of feeling, but no one can pretend that the reason is independent both of feeling and emotion. We have therefore to consider, whether any duality between thought and feeling is allied with the duality between cortex and thalamus, whether the two dualities are the same or different or whether they are wholly at cross-purposes with one another.

As the situation may be even more involved than one which merely posits the confusion of two dualities, we had better at once open up the whole question as widely as possible and ascertain what are all or any of the dualities concerned. The problem will present itself under three heads, subject to the general supposition that there is a physical duality between the cortical and thalamic regional systems which carries with it important mental results.

Are there other fundamental dualities, perhaps serious rivals to the above?

Are there other dualities overlaying the above duality and essentially coincident with it?

Are any of these other dualities, if they exist, cross dualities unconnected with the above?

In order to straighten out the problem to some extent and to indicate how difficult is the method of solving it, I will give provisional answers to all three questions. As to the first I will admit that there are serious and discussable dualities quite separate from the cortico-thalamic rivalry, and some of these dualities are world-old with vast traditions and venerable histories.

As to the second question, the reply, which also partly answers the first, will deny that any other duality is fundamental and/or coincident with the one which we have already discovered. Neither the old nor the new religious or philosophical dualities have real validity in the same way as the one with which we are concerned. The duality between thought and feeling is alone a serious rival to it; but feeling and thought can be shown ultimately to come from the same source in human nature, and to be destined to return to the same spiritual haven of reconciliation.

As to the third question, there are two other dualities or apparent dualities, which must be separately considered, because they are not identical with the cortico-thalamic rivalry and yet have very serious psychological meaning. One is the problem of the double memory, which is mostly cortical in operation, but yet has a very special connection with the thalamic system. Neither kind of memory is, however, specifically a cortical memory nor a thalamic memory, so far as we can examine an obscure subject. The other problem concerns what is popularly known as 'the unconscious self', which will be closely examined in order to answer the question, whether the instinct is wholly thalamic and extra-conscious, while the reason and intuition are wholly within the sphere of conscious cortical operation? We know already beforehand that they are not. But what conscious mental operations amount to and what consciousness itself is and whether there is a fundamental duality between our conscious and unconscious selves are other questions not easily answered. At any rate they offer a case for consideration.

In the present chapter the older spiritual or religious dualities and the two newer theoretical dualities will be considered and compared with the cortico-thalamic duality. In the following chapter, XII, the far more difficult question will be unravelled, as far as that is possible, as to the reality of a duality in feeling and thought and the conclusion reached that such a duality is not fundamental. In Chapter XIII the complexities of memory will be examined and some tendency to a duality indicated, but no final conclusion will be considered possible for want of the all-important physiological evidence of which mankind is in need. In Chapter XIV the burning question must be attacked, as to whether there is or is not such an entity as the 'unconscious self'.

In the end I shall venture to maintain the hypothesis that the duality between the cortical and thalamic systems, of which we see considerable physiological traces in the human and animal framework, is the only established and basic duality. It is affirmed to be a physical duality held in trust, so to speak, for our higher mental and spiritual purposes. Introspection will show very strong evidence that the mental and psychological duality situated in those seats of intelligence and power is the central fact in our human nature, governing our human life in every obvious and in every subtle way, proved, so far as we can prove it from our present knowledge, equally by arguments from mind to body as by legitimate inferences from the structure of body to the action of mind.

All other dualities are either ephemeral, fugitive and imaginary or merely functional dualities, as in the case of memory, like the use of a pair of hands, a pair of eyes or the two cerebral hemispheres of the human brain. The two latter organs, undoubtedly of vast mental importance, present unescapably certain peculiar problems of their own. It is generally admitted that each hemisphere has a special separate utility in controlling the motor mechanisms on the opposite side of the human body, the right side of the brain directing the movements of left hand, left leg, etc., and receiving sensations from the left side of the body. The left hemisphere similarly controls the right side of the body. But why are those extensive cortical areas also double, which have no motor nor sensory duties to perform? No one has yet accounted for the duplication of all the ratiocinative areas of the brain, of which, after all, it may be predicated that they must occupy a considerable part of the non-localized areas and perform an infinitely greater part of the more serious mental work. Perhaps they may play a great part in memory.

However that may be, the double hemispheres have formerly played a considerable part in mental theory. It is true that no duality of the self is any longer attributed to the separation of the hemispheres, but so late as the 'nineties M. Pierre Janet thought it worth while to discuss the doctrine in *L'Automatisme Psychique*. He quotes without assent La Metrie's saying that Pascal had a mad brain on one side and an intelligent brain on the other, as also a similar theory of Gaétan de Launay about dreams. He prefers Bastian's contemporary view that the unity of the brain was a more important and promising focus of study than any theory of localization of function. That is not the way the tide is setting.

While essential duality of the hemispheres is no longer alleged, an unfinished battle is still going on over the great incomplete issue of the localization of function in different areas of the brain. The opponents of the theory fight brilliant rearguard actions, which are much applauded; Flourens against Gall; Bergson against Broca;[1] but few people now suppose that they are not losing ground. Moreover, it is not merely a question of localization within the motor convolutions of the cortex, but of specification of function in the surrounding areas as well, and more recently also in the nerve paths.

As nearly all the new localizations are proved only in the brain of animals, there is still room for much scepticism about the meaning of the greater part of the large superficial area of the human cortex. The same cloud hangs over the subordinate bodies.

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[1] J. C. Chevalier, *Vie de Bergson*, pp. 54–5.

Apart from an immense amount of work done by experimenters abroad, such as Fritsch and Hitzig, Goltz, Kappers, Munk, Schrader and especially Von Monakow for the optical nerves and their connections, great credit is due to the reasoning of a few British observers, among whom stand out in the past, Sir David Ferrier and Sir Victor Horsley, who read important papers in 1890, of Hughlings-Jackson and Schäfer and above all to the investigations and deductions of Sir Charles Sherrington in our own time. The field open to the doubters is being gradually narrowed down and various disputed points are being settled always in favour of the greater accuracy of our knowledge.

In discussing human duality I shall turn aside for a moment to survey an allied phenomenon not quite the same, namely, dualisms. Dualism I take to be a philosophical and psychological duality, not strictly related to bodily structure or organs, such as dual vision, dual sensibility or dual thought. Dualisms lie chiefly outside us, even if they exert an influence within us. They concern questions of religion or of fundamental philosophy, such as the relations between mind and matter. They are closely related to our mental duality, with which they are co-ordinated and entangled. Dualism often overlaps duality and may be supposed to cause it. More often and more truly the view may be held that duality in function, our own mental duality, is either the direct or perhaps the remote cause of dualism in opinion or belief. We can easily take the view that influences, which really start from a double source within ourselves, are apparently given to us or imposed on us by a double source or from a double origin outside. Primitive and religious dualisms are hard to disentangle and classify. We find the same idea expressed in different forms, while different ideas are expressed under similar forms.

In the very brief sketch, which is all that space will allow me, I propose to distinguish between dualisms attributed entirely to external spiritual or physical power and those which religious thinkers, prophets or teachers believe to lie within our moral selves. There is also a neutral or intermediate class with considerable modern importance.

The most obvious suggestion of dualism is that between light and darkness, symbolized by Ormuszd and Ahriman or by the sun-god Apollo and dark Saturn. Such an antagonism in nature soon passes into a very simple conception that they are identified with the principles of good and evil, but essentially they are by no means the same thing.

The dualism between mind and matter is less obvious, goes deeper and has prolonged itself through religion into the recesses of our philosophies. It appeared in Christianity under the form of Manichæism, it flourished among the learned Muslim doctors of Spain and it penetrated modern philosophy through Descartes.[1] The Cartesian school held that mind and matter are so different as to make any action of the one on the other impossible. Leibniz regarded the same difficulty as so serious that, in order to overcome it and reconcile an apparently independent parallelism, he postulated the perpetual miracle of the intervention of God.

Both these dualisms pass easily into a dualism of supernatural personalities, identifying light or mind with God, the principle of good, and darkness or matter with the principle of evil. The essential principles of all these classes of dualism remain conspicuously outside human nature. They lie far from mental duality.

Other religions and philosophies, while often keeping the idea of God and his arch-enemy to the front, throw the emphasis of dualism within human nature, but without picturing it as a mental opposition. Intelligence either does not play a part at all or else it plays it only on one side, reason being naturally on the side of good. Conspicuous among them is the symbol of the white and black horses of Plato, representing the ideal and the grosser tendencies of the soul. St. Paul's bitter ejaculation, asking who would deliver him from the body of this death, alludes to a principle within him of destruction to all that is good in and to himself. So, too, the dualism of Descartes is imported into his human psychology by way of instinct, when he contrasts intellectual instinct with the instinct which we share with animals.[2] It is hardly necessary to multiply instances of accepted dual principles within us leading towards the good and towards the evil. Bunyan's City of Destruction is about the most picturesque form of it.

The two moral selves or perhaps the contrast of a moral and immoral self will appear again in another more modern form, but perhaps I may mention here the peculiar application of it given by a novelist of genius in Stevenson's *Dr. Jekyll and Mr. Hyde*, where the attempt to lead a double life breaks down owing to a loss of self-control and the collapse of the bodily machine. The opposite and presumably successful attempt 'to make the best of both worlds', as it is called, is represented in the old German freeliver's maxim: 'Lustig gelebt und selig gestorben, das heiszt dem Teufel die Rechnung verdorben.' In such a ribald tag and in the moral tale of R.L.S. we find an element of calculation, a wager between soul and body, where the body is confident and determined to win, which is more subtly and precisely expressed by the *mot* of Lachelier, quoted by Boutroux and Chevalier: 'Le débauché est un grand philosophe.' [1]

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[1] Mr. L. Roth has written an able analysis of the dualism of Descartes, as opposed to the monism of Spinoza.

[2] *Collected Works*, II, 597–9.

The most modern version of internal dualism is very popular in fiction and journalism and takes an evolutionary similitude. It represents the 'cave-man' with primitive and dangerous but attractive passions, as opposed to the principles of reason, culture, good-breeding, economic efficiency and domestic docility. This form of antithesis is psychologically important, because it has a right to rank as a 'general idea' owing to its widespread social and democratic popularity. It is not so new as it seems, as it was given a classical form by George Sand in *Mauprat* and the germ of it appears in *Jane Eyre*.

I have purposely stretched my net as widely as possible in order to catch not only the big fish but the small fry of both kinds of dualism, those reputed to be without us, morally and metaphysically above us or below us, as well as those represented within us as fountains of purity or secret corruption. In neither one class nor the other is there any hint of mentality. We never see a suggestion of man looking steadily, stereoscopically and simultaneously at both sides of a question; he is rather represented at the edge of a screen, looking first at one side and then at the other of a contest or drama of which he is shortly to be the protagonist. No foreshadowing of a dual intelligence intimately associated with ourselves, imbedded in us, constituting our very selves, has been sketched or remotely anticipated.

Two analogous intermediate or half-way points of view, representing dualism, have yet to be considered, which are neither without us nor within us. They are extremely unlike and yet intimately related. One is very old and the other is ultra-modern. Under wholly different circumstances and conditions they both propose to man the equivocal option as to whether he shall choose to go on living or not. The existence at stake implies life as we know it here. That is the essential alternative, which is entangled with but really separate from the totally different issue as to whether he ought to choose to continue living a life which is admittedly disagreeable. With the latter issue is involved a further possible existence, ultimate as well as immediate, life in eternity as enclosing life in time.

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[1] *Vie de Pascal*, p. 230.

Neither form of this dualism involves a mental duality, but they are not so entirely removed from it as some of the others. The question whether life is worth living or not, is not only occasionally argued by individuals in times of frustration or extreme distress, but has passed into both religion and philosophy and more recently into medical science. Its psychological import has been neglected. In the form of Buddhism it has obtained an ideal solution, which almost negatives its threat to actual life. The burden of existence is abolished only by a slow process, by the way of progressing towards a negative perfection in man through a countless succession of lives. The obligations of existence are acknowledged in time, although it may not be calculable time. None the less it is a denial of the truth that is supreme in most religions, as poignantly expressed by Blondel: 'Même au prix du sang, je ne puis acheter le néant, parce que pour moi il n'est plus.' [1]

A cheaper form of the philosophic denial of life-value resides in modern pessimism, as imported from the east by Schopenhauer and others. Its negative outlook has been perhaps ironically outlined by M. Maeterlinck: 'Il est puéril de se demander où vont les choses et les mondes. Ils ne vont nulle part et ils sont arrivés.' [2] It has been lightly judged by Blondel, in attributing to pessimists the conviction that it is better to believe in nothing than to accuse of evil a Supreme Being, whatever he or it may be.

A scientific and perhaps essentially new form of the dualism between existence and relaxation of life has been given to the same alternative by Dr. Freud, in his able analysis of the possible beginnings of life, consciousness and feeling.[3] His hypothesis is that every early stage of existence always offered a choice between maintaining or slipping away from a tension that was essentially disagreeable. News of the results of the process necessarily come to us survivors only from the side of a succession of affirmative answers to the problem. Various forms of affirmation are built up in our bodily and nervous structures, lifted up by thought and walled in by pain. Most of us will continue the affirmation until the last fight, when a man will have to face the revolt of his own pretorian guards.

The novelty of Freud's argument lies in his belief that the continued primitive personal struggle has never died down in the human race. It is being everlastingly renewed. We are carried on by life instincts, but there are death instincts, active instincts with a negative direction, ever near at hand. Our instinct to live is parallel to using all the means of living, including the instinct to use thought and intuition. Our instinct to give up is parallel to the surrender of the higher activities. It is probably a definite lower activity.

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[1] *L'Action*, pp. 1 and 29.

[2] *Vie des Termites*, p. 171.

[3] *Beyond the Pleasure Principle*, pp. 67–8.

I have been strangely intrigued with the force of this contention. I do not confirm its accuracy by introspection, but by observation of economic struggle its truth appears to me in a definite limited form. I have expressed this elsewhere [1] by distinguishing between two advanced and related instincts, those of life and accomplishment. In most of us the negative instincts are provisionally suspended. They are in contact with life-instincts, the contact of duellists, each holding the end of a silken cord. The instinct for release from tension awaits the accomplishment of the life's work. Whenever the special task is finished, release seems to draw near, unless and until another task is accepted. So duty runs its course and the negative instinct never positively comes into action.

In women the life instinct is unquestioning. In men the negative instinct hovers near and treads on the heels of accomplishment. This limitation in itself proves that the dualism is, if real, not universal, not organically seated and not fundamental. It is not true to say that instinct is always waiting to confute and destroy the work of reason and intuition. Nor is there a cortical and intellectual effort to terminate the existence of the thalamic and affective system. Across the gap that divides them reason is permitted to criticize crude nature and our organic and vital energies call for and allow the free play of intellect and intuition, under notice as it were, and subject to good behaviour, and on condition of 'hands off' of anything that may permanently injure the common partnership and especially the emotional interests of the senior partner.

Before leaving the present subject, there is one more unreal dualism or even duality to be examined. It has never presented any crucial philosophical difficulty to the student, but under the name of utilitarianism, a social-political doctrine has been built up on it, which has had during the last century a greater influence on legislation than any other theory. An entirely fictitious psychological antithesis has been built up on a reputed opposition between pleasure and pain, which has no title to consideration beyond its wide acceptance and the crushing influence which is wielded by the general tribute of mistaken but genuine opinion.

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[1] *Psychological Theory of Value*, pp. 94–8.

As far as we have gone among the dualisms every antithesis has had some philosophical justification, and often also some psychological grounds for its claim to represent truth. Utilitarianism is unique among the reputed intellectual systems in having been the instrument of great reforms and exerted powerful influence on legal thought, while having made but an inappreciable contribution to truth in either science or philosophy. Of all the systems probably this is the most fundamentally wrong, but it has always worn an air of obvious lucidity, of scientific certainty, of easy access to undiscovered truth, which has drawn popular opinion after it and made it a good working hypothesis for the destruction of errors in antiquated and more cumbrous bodies of principle.

Philosophic and scientific opinion were long accustomed to take pleasure and pain for granted, as physical facts, but no stress was laid on their real existence in the metaphysical sense. Their apparent contrasts were not used to provide a foundation of doctrine, a decision which was based on sound judgment as well as insight. With the emphasis laid upon pleasure and pain by utilitarian principles, people began to ask what the new elements were, and no adequate reply has been forthcoming. Neither pain nor discomfort are what they were thought to be and pleasure is even more elusive.

Modern opinion has thrown considerable light upon them and diminished their specific importance. Professor Sherrington describes pain as the 'psychical adjunct of an imperative protective reflex' and says that it is almost a skin-sense.[1] Professor H. C. Warren describes the pain-sense as distinct from the organic senses and general sensibility. He does not believe that specific receptors have been located.[2] Other observers, like Dr. Herrick, are more adventurous on this point: 'In the human organism pain appears to be a true sensation with its own receptors, probably with peripheral neurons and certainly with well-localized conduction paths and cerebral centres, those centres being thalamic and not cortical.'[3]

Sir John Parsons takes the view that there are definite nociceptors, pain-spots, like cold- and warm-spots. He writes that 'pleasure and pain are not accurately antithetic'.[1] Sir Henry Head wrote in *Brain*: 'It is necessary at the outset to distinguish clearly between discomfort and pain. Pain is a distinct sensory quality equivalent to heat and cold. . . . Discomfort on the other hand is that feeling-tone which is distinctly opposed to pleasure. It may accompany sensations not in themselves essentially painful . . . the reaction produced by repeated pricking contains both these elements.'[2]

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[1] *Integrative Action of the Nervous System*, p. 228.

[2] *Human Psychology*, p. 207.

[3] *Introduction to Neurology*, p. 289.

Among the philosophers Mr. Bertrand Russell writes that 'it becomes more natural to regard discomfort and pleasure as properties of mental occurrences rather than mental occurrences themselves'.[3] Dr. Moore, discussing pleasure and pain, tends to approach the same attitude of indifference: 'We cannot assume that the presence of pleasure always makes a state of things better or that the presence of pain always makes it worse. But pain, being an organic unity, is by itself a great evil.'[4] M. Blondel rises, however, to the most complete comprehension of a philosophic view of pain which overrides or overlooks discomfort and allies itself with strange appropriateness to the advanced scientific standpoint. He regards pain not as a universal law, but as a human need. 'Seul l'homme se violente, se combat, se fait souffrir, se tue, travaille en agissant.' . . . 'Ainsi la souffrance consciente suppose la présence en nous d'énergies inconscientes, qui ne se rallient pas toutes d'emblée à la volonté, quelle qu'elle soit.'[5]

There is no analogy discoverable between any dualism of pleasure-pain and any duality of instinct-intuition. But by taking a cross-section, so to speak, of this pair of dual relations and including the forgotten factor of discomfort on the pleasure-pain side together with reason on the side of instinct-intuition, we find a remote and fallacious affinity in the two situations. For instance, the primitive and untaught instinctive faculty seeks pleasure and shrinks from pain. The reason will avoid pain, but regard pleasure with some distrust. The intuitive faculty can rise to greater heights; it will shun the false attractions of expected pleasure; it can override the terrors of pain; and it can face with composure the more pertinacious pressure of that low state of feeling-tone, which may sometimes be called discomfort, depression and dejection or even distress, sorrow or despair. The very variety of possible terms involved, each of them fraught with special sinister meaning, makes it clear that the supposed dualism of pleasure-pain is entirely illusory. It remains for us now to examine in detail by introspection the three separate elements of pain, discomfort and pleasure and to see how much will come out of the analysis.

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[1] *Perception*, pp. 9, 19, 74, etc.

[2] Vol. XLI, Pt. II (Sept. 1918).

[3] *Analysis of Mind*, p. 70.

[4] *Principia Ethica*, p. 212.

[5] *L'Action*, p. 161.

In analysing pain and painful sensations we find some difficulty, on the physical side, owing to the as yet unweighed significance of the recent Head discoveries, elaborated and carried to a higher degree of elucidation by Parsons, known as the distinction between the parallel epicritic and protopathic or dyscritic systems of sensation. As these have to be analysed later, their consideration must be omitted here. The distinction does not affect the psychological view of pain, beyond showing how much more complex and delicate the machinery of feeling is than anyone before our generation realized or suspected. Pain is primarily an acute skin sense and the more active pains are stimuli on the external skin. Much more mysterious and indefinite pains affect the comparatively insensitive inner linings of our body. Since most of these belong to the protopathic or primitive system, they pass easily and ominously from slight warnings to extreme and terrifying limits in which discomfort is powerfully mingled. Attacks on the frame and heavy pressure on bone bring heavy dull pain and a peculiar sense of shattering discomfort, which I will call 'structural alarm'. Those are the three kinds of pain.

Discomfort is far more complicated in itself, besides the special fact that many states of discomfort are brought about by heavy pain. At least six can be enumerated, of which I will begin with that which I have named 'structural alarm'. An accurate description of this was given me by an able writer, the accomplished musical critic of the *Manchester Guardian*, the late Arthur Johnstone. I had to accompany him when he had many upper teeth pulled out and his remark was illuminating, when one remembers the intimate and disagreeable feeling, that it is not the teeth but the whole top of the head that is being pulled out. What he said was: 'It is not the pain I mind, it is the beastly interference.'

Structural alarm probably assaults the whole central sensory system of the thalamic region. Closely allied to it are: blood alarm, acting through the eye, from which medical students sometimes suffer; noise alarm or shock, acting through the hearing; and balance alarm or vertigo. Visceral alarm with its extreme results of nausea and loose bowels is a very violent general assault on our ideas of safety, which frequently has emotional and intellectual elements, but is very often brought about physically by what Parsons calls the consummatory action of several distinct and distant pain stimuli, exciting simultaneously nociceptors situated in different parts of the body, such as eye and ear together, skin and structure together.[1] The result of many of these compound phases can be 'general shock', which, as is well known, may accompany nominally painless operations and kill the patient when all cause for it seems past. It is possible that such a disaster may result from the assaults of pain that neither surgeon nor physician can reach, because they have never been felt in consciousness.

The most elusive, variable and common form of general discomfort without pain is what I shall call 'frustration alarm', a prevailing, secret, intimate and largely unconscious or extra-conscious terror, that what we most want, desire or need will not be given us, will be denied us, or will be taken from us. Frustration alarm will cover all cases of sexual or other complex, which the psycho-analysts have succeeded in curing by laying down some of the laws of its hidden causes. All repressed activities, all severe disappointments, all rivalries, jealousies, envies and hatreds will bring about frustration alarm and throw the sufferer into serious illness on the one hand or into bitterness, discontent, melancholy and rebellion on the other. 'From envy, hatred and all uncharitableness Good Lord deliver us' is as much a legitimate prayer for physical aid as the prayer to be delivered from sudden death.

Leaving pain and discomfort we pass, in considering pleasure from physical and mental states comparatively well-known and appreciable, to another element that is so indefinite as to be almost unseizable and unrecognizable. I can name six causes or conditions of pleasure, but I do not know what pleasure is.

Pleasure cannot be positively defined. It is not in any way conation, although conation and effort are not excluded as auxiliary conditions. It is wholly contingent. It accompanies certain bodily states under certain circumstances. It is dependent on the time-rate as well as on the force of certain kinds of stimuli, on which there is temporary accentuation. The accentuation may come from outside causation, but it is more likely to come from within by predisposition, association or mere attention. The accentuation is not necessarily more important than the time-rate.

The specific core of the external cause of any physical pleasure appears to lie in a time-rate—a time-rate between individual stimuli of the same kind in a certain series.[1] Whenever the stimuli vary in kind, a mixed state results, which is probably not pure pleasure. When mixed states containing pleasure have lasted long enough, they come to resemble an emotional state. Pleasure, however, is not an emotion. All the essential characteristics of emotion are strongly intellectualized, whereas pleasure has broken away from the realm of thought, where time is no longer valid. Self-examination or introspection of pleasure tends to bring it to an end.

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[1] *Perception*, p. 31.

Pleasure, like pain and discomfort, but to a greater degree, is concerned with highly transitory conditions of feeling, as I shall describe later.[2] It is therefore eminently connected with time. It is necessarily on the opposite edge of feeling from thought in any mixed state. As thought is largely an enemy of keen pleasure, so pleasure is to some extent hostile to thought.

Pleasure depends on the repetition of stimuli, on their acceleration or on their discontinuance, sometimes on the bending of the whole system to favour and encourage certain stimuli or to resist and do without them. Pleasure cannot exert this force itself, but it can call on the bodily and mental powers to expend their energies in its favour. By exciting or continuing irritation and unrest, desire for any particular pleasure can produce a state of mind and body favourable for certain stimuli, until the potency of these stimuli is exhausted. Bodily forces are used to increase pleasant stimuli and mental forces are in the last resort summoned to quell the effect of all stimuli bringing pain and discomfort, if not avoidable otherwise.

Head could not find any mild positive pleasure for the purposes of his experiments. The nearest was a gentle warmth, which could not be much increased or accelerated.

Being wholly ancillary and contingent, the nature of pleasure can only be analysed in respect of its conditions, favourable or otherwise. It can be described as a momentary accompaniment to the satisfaction of various kinds of demand as follow:

(1) Demand for continuance of a specific sensation.
(2) ,, ,, acceleration of a specific sensation or its diminution.
(3) ,, ,, discontinuance of a specific sensation.

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[1] See note on Pleasure at the end of the present chapter.

[2] See next chapter, XII, for definitions of thought, feeling and emotion.

(4) Demand for balance or the straightening out of opposing demands among varying tendencies.
(5) ,, ,, rest, temporary or permanent from some or all sensation.
(6) ,, ,, release from frustration in face of a specifically hostile obstacle to activity.

The so-called violent pleasures can all be classed under conditions (2) or (6). Both depend upon a large measure of physical health and strength, as well as temperamental tenacity, to make them effective.

Of these two enhanced neural conditions, which can hardly be called states of consciousness, the first, (2), which may be described as the satisfied demand for positive physical pleasure, depends for its continuance on the subject being able to endure a rapid and heavy acceleration of strong stimulation without a reaction fatal to its purpose. These states or conditions precedent to or favouring physical pleasure will be found, if analysed, to contain elements of unrest verging on pain. The strenuous impulses will not necessarily cease with the advent of pleasure. They may well contain what the poet Shelley has described as: 'that unrest, which men miscall delight.' The unrest which calls for acceleration will call for greater acceleration and acceleration at a greater rate, until the limit of endurance or the lengths to which reason and the will may permit, have been reached.

The second enhanced condition of pleasure, (6), may be called in comparison calm. The circumstances arise in the desire for release or escape from a negative condition preparatory to some activity. The desired opening imports, when achieved, a mental and perhaps physical satisfaction caused by the removal of accidental or willed frustration. Such occasions are the special privilege of the cribbed, the cabined and confined after escape and excuse much turbulence. The natural joyous outbursts of youth in effervescence after repression can be well understood; even when excessive they hardly need to be forgiven.

Coming on middle age the pleasure in long-deferred opportunities may be spoilt by bitterness or the capacity exhausted by the period of waiting. According as the organism has the tenacity, which allows of its being bent back against the force of inclination without losing resilience, so will the benefit of release be turned into the most justifiable form of pleasure that human nature can enjoy. Since legitimate compensations have, so to speak, been earned by effort and suffering, the danger of reaction is far off and the possibility of mildly pleasant and permanently satisfactory conditions is within reach.

The conscious balancing of pains against pleasures in the future is a perilous business. It is all the more so since the ordinary units of either psychical phenomenon do not and cannot be made to correspond. If not firmness of character, what is called greatness of heart is required. Many men have it not unnobly in their blood under the guise of a courageous spirit. It is the spring of many a fine ambition and ideal aim. But it is also the permanent motive of the spirit of daring and speculation, after the first impulse towards testing the hazards of fortune has been presented by instinct and the charm of the alternate ups and downs have become in time a habit and a necessity.

Owing to the present admitted conclusions, that the common notions of pleasure are pardonably mistaken, that pleasure is entirely conditional, and that it cannot be called a state but almost the opposite, the idea of pleasure should not reasonably be evoked as a motive. Pleasure, of course, is not a desire.[1] Belief in the validity of pleasure may become a motive and lead to desire. The ultimate goal of a desire for pleasure in itself must result in illusion and disillusion. The late Oxford philosopher, T. H. Green, followed up this track into the further thesis that not only did pleasure not lead to happiness, but that happiness could not be obtained, when sought as an object in itself. But not being a psychologist, he did not carry his thesis beyond his *Prolegomena to Ethics* and it remains an incomplete philosophical foundation for the study of pleasure and its various forms and consequences. Although a criticism of the theory of happiness is strictly in line with an examination of the nature of pleasure, it is too far away from my present search for duality to be followed up here. Happiness would be a fitting subject for study in considering the reconciliation of advanced instinct and intuition.

What is called the desire for pleasure is a desire for the return of certain states of conscious activity or receptivity, which by their nature can never be reproduced. Any particular process, such as intoxication, can be produced, but the conditions of its former application can never be reproduced.

The illusory demand for pleasure is therefore a real demand for something quite different. In youth it is a demand for acceleration of stimulus in certain approved states, in order to secure a progressive series of ever pleasanter and pleasanter states, each of which is successively unstable. In old age the demand for pleasure is seldom acknowledged as such, but a parallel with youth in inverted form becomes more frequent in a demand for a diminution of disagreeable states, passing into a demand for balance and a demand for quiescence.

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[1] For definitions of Desire and Belief, see following chapter, XII.

Wherever the confused idea of pleasure is associated with conation, with some form of effort implying resistance to or attack on temporary frustration and the possible release from frustration, conditions are present where pleasure will necessarily occur. Pleasure will occur immediately in the case of success. Pleasure will ultimately occur on reflection in the contrary event. But the identical pleasure will not arise from the imagination nor from anticipation, both of which tend to diminish the ultimate form of pleasure. Nor does it reside in the mere achievement, as is generally but falsely supposed, but in consequence only of the release from all the previous frustrations involved in the conation. The pleasure accompaniment is largely a matter of time-rate. With a rapid achievement the pleasure-content is high, but the state favourable to its continuance is more unstable.

There is no reason to suppose that pleasure is always and altogether conscious. Just as physiological 'shock' may lead to grave consequences due probably to unconscious pain, so prolonged rest from shock may be a period of unconscious pleasure. In this manner self-denying achievement, with a minimum reward in any apparent satisfaction, may lead to quiet states of recuperation and strength, which have extra-conscious equivalents to pleasure and have little overt resemblance to the turbulence of triumph or exultation.

In the philosophy of pain and sorrow, of discomfort and distress, of pleasure and delight, of joy and satisfaction in faith and belief, the prophets, the idealists and the moralists have been the better psychologists and the utilitarians nowhere. As some kind of economist may I be forgiven for pointing out that the identification of labour with distress, of conation with effort-pain is wholly mistaken, even when advocated so ably as it was by Stanley Jevons. It is one of the hasty generalizations of hedonistic economics, which contribute peculiarly towards the accentuation of popular prejudice and lend themselves to the purposes of propaganda in favour of the illusions cherished by a certain quality of sedate ambition.

The utilitarian philosophers have been comfortable men. They have left as little elasticity in human nature as there is vision, balance and evidence of perspicuity in their own doctrine. Although they have a case, which can obtain the assent of many people, it can only be argued out on the instinctive level of intelligence. Neither in reason can they prove their case, as Dr. Moore has abundantly shown,[1] nor on the level of the intuitive faculty do they obtain anything like general support. Henry Sidgwick's defence of intuitional hedonism seems to be the only attempt to carry on the battle on this ground.

Among the older philosophers, who worked in the days before they were provided with scientific tools, the definition of contrasted states of pleasure and pain has been best exemplified, as we might expect, by Spinoza. But he avoided the difficulties of denoting degrees of pleasure and pain by specifically disregarding anything but their quality. Joy he described as the passage from a lower to a higher state of perfection and sorrow is stated to be the contrary. Allowing for some loss in exactness by his magnificent understatement, no more adequate definition could be given of a vital aspect of human nature; yet it is evident that in his definitions the antithesis does not lie between two states of consciousness but between two standards of perfection acquired in our progress towards the knowledge and love of God, or as he calls it: *Amor Intellectualis Dei*.

There is no dualism at all between pain and pleasure. It is doubtful whether an approximate opposition can be predicated between pleasure and discomfort, unless they are logically made so by definition in placing them in ascending and descending degrees on the same scale. To this course there are serious objections.

First, discomfort is most naturally defined as a low or negative condition of feeling-tone, a particular aberration from the 'tonus' or state of general healthy rigidity usually maintained by the nervous system. Pleasure is not a sensation, though it can be aroused temporarily by sensations. It is doubtful if it can be described as a feeling, which pain certainly is. Successive feelings in definite series may be accompanied by varying degrees of pleasantness according to the conditions under which they occur. A certain sequence, A, B, C, D . . . of feelings of satisfaction in specific duty exactly accomplished, as a regular habit, will give different shades of pleasantness on different days.

A second more important objection is that discomfort cannot be reasonably defined without including pain. Any inclusion of pain takes discomfort out of the opposite category from pleasure. Pleasure is neither a state of consciousness nor a sense. Pain is probably a sense and is certainly awareness of sensory stimuli, which, though they generally involve discomfort, may even be accompanied by pleasure, however wry the face may be of the owner, who is said to be enjoying himself. No one will deny the validity of these mixed states, which can be realized sometimes by riding on horseback or diving into cold water or in the course of religious self-mortification.

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[1] *Principia Ethica*, pp. 18, 81–7, 100–8.

The antithesis of pleasure and pain-discomfort is not a dualism and it is not a duality in the sense of any definite location or connection with physical organs. It is far from being a mental duality or having any fixed relation to mental duality.

Bringing pleasure, pain and discomfort into relation with the instinctive level of intelligence it is probable that all three are at that stage in a state of comparative confusion. They are not yet separated from one another on the scale of delicate discrimination that ultimately comes to prevail on a more careful and more intelligent analysis. Taking common human nature without pretensions, we will instinctively like what we call pleasant things, that are not only bad for us but are in the course of becoming rapidly sources of uneasiness and ultimately of pain.

Equally there is an instinctive shrinking from a large group of heterogeneous experiences offering very various degrees of the objectionable qualities, which we call shocking to our sensibilities, such as ugliness, poverty, want of fitness or culture, etc. A reasonable level of criticism will present all these facts to our judgment under examination in new and perhaps diminishing degrees of disagreeableness, which are fundamentally altered from our previous casual views. There remains an even higher level where education in real values will bring about more surprising changes in our estimation of what can be endured and what should be desired.

We may well ask here what is the governing consideration about our ultimate judgments on unpleasant as compared with pleasant states. Is it not based on the consciousness of some universal law, which lies below all the varying conditions? We label the conditions with complicated names without understanding them. We pay little heed to the unifying feature.

Between facts of sensibility of very varying kinds there is a general relation, which is probably one of balance. It concerns feeling, which will be analysed in the next chapter. There are conditions of our awareness which we wish to continue and others which we wish to discontinue. The unifying relation is one between any pleasant condition and its certain reaction.

If that be the fundamental explanation of so many difficult points, we must be prepared to find that the pleasure and counter-pleasure reactions tend like other reactions to be equal and opposite to the circumstances or conditions antecedent to them and eventually over a long period will tend to be equal to each other. The sum of the pleasant conditions of all kinds on one side will tend to be equal to the sum of all the unpleasant conditions on the other. Any body of doctrine which aims at securing either a large pleasure balance or even a small permanent balance of pleasant conditions on one side and fails to reckon with the necessary reaction on the other side is quite certain to be nugatory.

NOTE

Pleasure seems to me at present undefinable for the following reasons. To begin with it is admittedly not homogeneous. There is the kind of suspended pleasure, coming fugitively into consciousness, as either common self-approval rising to self-exaltation; or as the more remote recognition that the individual is acquiescing in and even welcoming the will of God. More obviously there lie around us varieties of what is called ordinary physical pleasure, which is not so easy of explanation as it appears to be.

In physical pleasure there are apparently four factors, of which three have been observed and studied, but the fourth has been generally overlooked:

(1) Temporary static receptive condition of body.
(2) Degree or force of stimulus.
(3) Rate of application of stimulus.
(4) Reaction-capacity of the body to degree and rate of stimulus, or the power of absorption of stimulus without loss of elasticity.

In any set experiment all the first three factors may be taken as given. But there is no method of determining the fourth, except by the permanent and even the deferred results of the experiment. The transitory results, given under the name of pleasure, are misleading. Fatigue may be disguised but not abolished. Pleasant sensations may be yielded, while the net loss of energy to the organism involved may be damaging. Chiefly on account of this particular respect, wherein their appearance may be premature and deceptive, the indications of pleasure are disregarded in any form of hard bodily or mental training. Pleasure itself is personified in many forms of religion, as not only cloaking evil, but as being the substantial essence of evil.

In natural life processes there are very peculiar cases, as for instance with the 'praying mantis', where pleasure appears to be an indication of benefit to the whole species or race, while at the same time there is loss and destruction to the individual concerned.

Given these four factors, pleasure either depends on or comes near to being a compound of two relations of proportion. Relation (A) is to be taken between (1) Condition and (2) Stimulus. Relation (B) is to be taken between (3) Rate and (4) Reaction-capacity, because the response is governed more by the rate of application or repetition than by the original degree of stimulus. Acceleration, which we all know to be one of the chief requirements of a sustained condition of pleasure, is a function of the rate of application and not of the original degree of stimulus. Increase of stimulus has much the same effect as acceleration of application, but it is more destructive of resilience and reaction-capacity. In such common forms of sensation as the application of heat the effects of the two methods of increase on sensation-result are almost indistinguishable, so that I am loosely using the term acceleration as sometimes applying to increase of stimulus as well as to more frequent application.

There is one startling difference between relations A and B. Relation A has a comparatively wide range of possible variations, since the actually or potentially pleasant condition may include gradations of pain. But the relation B has necessarily to work within a comparatively narrow range, as otherwise even a slow acceleration or slight increase of stimulus will destroy reaction-capacity. It is possible that a painful condition of relation A, when accompanied by a very minute acceleration in relation B, should meet with a reaction-capacity in the latter relation, which would convert the painful nature of the first relation into a pleasant one of self-control or victory. Under paradoxical circumstances the true definition of the overriding relation between relation A and relation B, if it does not escape us altogether, seems to me to involve complications in which the conventional meanings of pain and pleasure become inverted. The most abiding feature of the collision of opposing tendencies seems to reside chiefly in a time-rate, and to a less degree in an increase in the force of stimulus.

The latter relation B is more important to pleasure than the relation A. Of the two factors in relation B (3) is the deciding variant and (4) is the passive factor. The condition of the body is necessarily determined beforehand by its present condition previous to the application of the pleasant stimulus, as in factor (1), and also by its inherent reaction-capacity due both to heredity and life-history.

The intimate connection of pleasure with time and a time-rate is one of revulsion. At a certain moment and after a certain acceleration and/or increase of stimulus the pleasant condition is ready and certain to reverse itself. Revulsion is sure to come, either at once or later in some altered form.

The same fact is true also of pain, but the method and procedure are different. The psychic factor of pain-reversal is held in suspense by the potent bodily factors in pain. Pain is protective in a physical sense. The body therefore persists in pain and even increases it with continuance of stimulus, as an added warning. However, ultimately the psychic factor of pain-endurance begins to assert itself; the pain, though not diminished, becomes tolerable; very slowly the law of reversal begins to operate at a very much longer interval. In other words, the psychic time-rate, which operates rather rapidly to bring about reversal in pleasure conditions, produces effects so slowly in the case of pain, that the essential similarity of the two sequences is very often disguised.

In consequence the dominant variant in relation B remains as said above, factor (3), namely the rate and intensity of application of stimulus, in other words, 'acceleration', including increase of stimulus. To describe physical pleasure as 'acceleration of a kind of conscious state' or as a 'kind of time-rate of stimuli' will bring us nearer to its true essence than any other definition; but obviously they are inaccurate and inadequate. They do not include the possible increase of stimulus, which, though it resembles acceleration, is not quite the same.

Nor is it sufficient to describe any pleasure-discomfort condition as a mode of reaction or physiological attitude of the whole nervous system, as Dr. Herrick does: 'intimately bound up with certain visceral reactions of a protective sort, whose central control is effected in the ventral and medial parts of the thalamus' (*Introduction to Neurology*, p. 289). Such terms will cover pain-discomfort, but not pleasure. In any case neither pain nor pleasure seems to be conspicuously involved in cases where the whole response and reaction of the nervous system are either of a healthy indifferent or of pathologically defective character.

Further, the pertinent question will probably be asked as to what this intricate analysis has to do with the well-known and obvious attractions, labelled *pleasure*, which as Dr. Freud remarks, affect us so powerfully. The latter are not necessarily pleasant. They are of two kinds, consisting of obscure tendencies towards:

(*a*) *Violent States*, involving a perilous wrench by the rapid acceleration and/or increase of certain sensations to the organism, certain to involve immediate responses, extreme reactions and ultimate revulsion of sensation and feeling. These are technically characterized as impure, although as a matter of language no pleasant state is really pure, since some process of reversal is always to be anticipated.

(*b*) *Mixed States*, of which there are not essentially many, where bodily sensations are overlaid and confused with release from frustration and/or the accomplishment of some conation, such as an intellectual or artistic achievement. They follow the lines as given above in the text. The gamester's passion is a comic parody of the second order, which should really be classed with the first. Successful rivalry is a violent and mixed state.

Although the definition of pleasure seems to me at present rather more than difficult, there is a sense in which the aggregate of pleasant conditions is measurable and a certain accuracy is probably not unattainable. That can be achieved, after any definite and ascertainable pleasure, by taking the aggregate of all following unpleasant conditions over a certain period or for a certain group of transactions.

Pain is generally measurable; discomforts, frustrations and disappointments are to a less extent open to estimation. The ultimate reactions from either or all these in contrasted groups together during a certain given period would afford a measure of the approximate pleasurable content or the reverse, which must be exactly equal in sum to the total of the unpleasant or pleasant conditions.

A procedure not unnaturally parallel to the balance of real life is that frequently adopted by many writers of fiction in piling up accumulated trouble on their favoured characters in order to secure for them a maximum of final satisfaction. An admirable example is to be found in the Book of Job.

An analysis of this nature only makes it more apparent that the utilitarian calculus, tending to show a balance of pleasure over pain, is scientifically non-existent. It is never likely to be recognized as absurd.

No account of æsthetics will be complete which does not elucidate the following difficult points about pleasure pure and simple. The relation of pleasure and its negatives to consciousness is very obscure, but the complete interdependence of the two is not established. The relation of pleasure to memory is not to be neglected. Consciousness appears to be necessary to memory, while pleasure is probably an enhancing factor. Pain in consciousness involves partial inhibition of memory, which may in some cases amount to absolute suppression, but of this there is no certain proof.

Finally, we must remember that Spinoza attached importance to the relation of joy to well-being in the sense of making the former depend on some degree of the latter. He never gave us a criterion whereby we might distinguish those kinds of pleasure which give a small quantum of well-being with a heavy revulsion of discomfort, from those where the condition of final well-being seems to involve the highest permanent satisfaction. It seems to be generally accepted that a certain steady rhythm of pleasure is a necessary condition of complete well-being. The practical difficulty is to maintain it.

Having given, mainly from introspection, a short explanation of the difficulties arising in the definition of pleasure which are due to its multifarious character, it seems to me from the point of view of cerebral mechanism that they are attributable to the inferior quality of the intelligence, called instinctive, lodged in the thalamic region. Pleasure is doubtless only a provisional stage of compound sensation accepted with vacillating judgment as a form of good by a second-rate intelligence. The frequent resulting mistakes are corrected as best they can be by the higher intelligence of the cortex, either consciously by reason or extra-consciously by intuition. It is important to bear in mind that pleasure is accepted by instinct, as a form of good or well-being in all seriousness and good faith; not, as is sometimes supposed by ascetics, out of a perverse and obstinate preference for evil.

The expectation of pleasure, which is important in regulating conduct, is to a large extent the same as economic value. The latter is a kind of summarization of the former. Economic value tends to surpass the cult of pleasure, because it is more strenuously, more systematically and more seriously pursued. To a small extent the instinctive pursuit of economic goods, which yield the conditions of pleasure, is modified by experience and the higher processes of criticism in the rational intelligence. To a very small extent the instinct is educated by the intellectual and intuitive faculties to aim at absolute instead of economic value.

CHAPTER XII

DUALITY OF FEELING AND THOUGHT

In the last chapter several promising dualisms were rather briefly discussed and dismissed on the ground that no case could be made out for identifying any of them with mental duality. No one of them fitted a mental duality, which is divided physically between the thalamic and cortical regions and shows itself in the intelligent dual system of instinct as contrasted with the intellectual and intuitive faculties. On the other hand, a great deal of space was given to a close analysis of the pleasure-pain opposition, about which there was a far less obvious case. It was clearly a wholly illusory dualism, which had no intrinsic claim to so much attention.

Yet there was more than one reason for pulling the utilitarian case to pieces and analysing its foundations. In the first place it was strongly supported by prejudice, instinctive prejudice, if you like. Again, it has had great political and social influence in the recent past, more so than any other sociological theory, and it is only recently being outstripped by collectivist and communist tendencies, which are the next stage in the natural evolution of ideas of a widely popular character and equally dependent on innate instinctive intelligence.

Utilitarianism receives much lip-service from practical men, who in their private judgments cling to nobler and sounder generalizations. The most notable motive for destructive criticism of pleasure-pain-discomfort theories has yet to be mentioned. It resides precisely in that moderate degree of elevation of thought which connects itself most naturally with a wide range of instinctive sympathy and leans most firmly on generous feeling. Among the merits of utilitarian doctrines may be reckoned their superficial clearness, the simplicity of their application, and their power of enlisting genuine popular support. It is necessary to realize that their broad appeal and ready applicability rather than their inherent validity constitute the secret of their influence. They have advanced exactly to the level of the instinctive intelligence and cannot effectively claim to reach a higher mark. The alliance between a high grade of feeling and a lower grade of intellectual grasp is a natural instinctive phenomenon and lends itself especially to rapid communicability between large masses of people. To use a common phrase: it is an organic combination and serves better as a firm foundation for utilitarianism than a better and more consistent system of thought.

In respect of its complete fulfilment of the natural requirements of a body of social and political doctrine suitable to the strenuous but undeveloped instinctive intelligence, I do not suggest that the utilitarian calculus of pleasure-pain is unique. But it is interesting, because it is typical. It is the most successful modern version of the triumph of the instinctive and thalamic mental organization. The concentration of its system round a definite high proportion of feeling, as combined with a definite low degree of intelligence, is not accidental and is not to be reckoned as a defect in any vigorous stage of progress. At bottom the problem is bound up with the peculiar relations of feeling and thought.

The power of these specific combinations resides in the fact that the proportion of both involved in their union at a stable level is an organic proportion. Neither moderate intelligence nor high feeling have any ecstatic virtue in themselves. But the relation of the amount of each to the natural capacities of the instinctive intelligence is the governing factor in the amount of energy they develop and the degree of influence they exercise. The right proportion of each constituent is a function of the value of the combination, which may be compared rather with economic than with absolute value.

From the consideration of pleasure and pain we are thus brought to the consideration of an equally famous duality of far greater fundamental importance, generally ascribed to the organs of the heart and the head. It really concerns the opposition, or to speak more accurately, the distinction between feeling and thought. Without doubt we here broach the most difficult problem in psychology. Whatever conclusion is reached, there can be no certainty in the matter and, though I have arrived with great deliberation at a definite opinion, I do not pretend to be dogmatic about it. I believe that feelings and thoughts are identical things when they start out to shape themselves in the human mind, that after a period of differentiation they drift far apart from one another, and that, given time to develop, they may possibly end their career by again becoming identical.[1] There is therefore here no material for a real mental duality.

At first sight there is a great temptation for the psychologist to throw all the feelings on the side of instinct and to assemble all the thoughts on the side of intellect and intuition. But the distinction is too easy to be tenable. We cannot deny a considerable amount of intelligence to instinct, which is, under emergency, capable of combating and controlling feeling. On the side of reason feeling plays a restricted part, which it would be ridiculous to deny. The almost irrefutable argument against the banishment of feeling from the cerebral hemispheres is to be found in examining the physical organs for the sense of smell and their connections, on the importance of which I shall dwell later.

While all the other sense-stimuli pass to the thalamus before being relayed to the cerebral cortex, the messages of smell treat the upper-brain cells as an immediate end-organ and the thalamus as a side blind-alley.[2] This must be considered conclusive, if we accept any argument at all from body to mind. It is quite impossible to hold that smell sensations are pure ideas or to treat their occasional subtle and very indefinite, almost crushing, power over our feelings as if they belonged only to the 'pale cast of thought'.

That easy and superficial allocation of feelings and thoughts to separate end-organs is closed to us. There is no physiological guidance in the difficulty. We are thrown back on introspection. Let us turn again to the direct and original views of Dr. Jung, an observer who takes nothing at second-hand. He writes that feeling is one of the four basic psychological functions, the others being sensation, thinking and intuition. It is primarily a process that takes place between the ego and a given content, a process which imparts to the content a definite value in the sense of acceptance or rejection. The nature of a feeling-valuation may be compared with intellectual apperception. Thinking he describes as that psychological function which in accordance with its own laws brings given presentations into conceptual connection. It is an apperceptive activity.[3]

As psychological descriptions of processes, both these statements appear to me to be admirable, even if I am not adopting them as definitions. Before analysing them further, perhaps I may be allowed to pass on to what Dr. Driesch writes, who throws the emphasis in the other direction: 'Thinking means to have a thought and never anything else, at least in the sphere of consciousness' . . . 'Feelings are objects; they are thoughts with a strong prevailing accent of pleasure-discomfort.'[1]

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[1] This condition would be reached in Spinoza's *Amor Intellectualis Dei*, or as the English prayer-book less accurately puts it: 'the knowledge and love of God'.

[2] See Fig. IV.

[3] *Psychological Types*, p. 543.

Both these vigorous thinkers are quite emancipated from formal tradition. I think they are right in their main point in bringing feeling and thinking, thoughts and feelings into intimate contact. At certain early stages of development feelings and thoughts are one, but as we cannot stain them blue and red respectively at the moment of their separation in our grey matter, we cannot follow their further course by any method except by opinions founded on introspection.

It is clear that both thoughts and feelings are to be regarded as a form of mental content, implying intelligence. They are not necessarily a primary content, as they are probably compounds of something else. The most penetrating feature of Jung's analysis appears in his showing that in feeling the mind weighs and values some of the content in question without troubling about form, while in thinking the mind is disposed to give form to some of the content and naturally to give to the form a certain element of permanency. In this profound discrimination he has in my opinion arrived at the essence of the question and from that point I shall make my start.

The immediate difficulty is to avoid being drawn into a discussion of what Professor Bergson calls 'Les données immédiates de la conscience', or more briefly sense-data, sensa and sensory recepts. For all these purposes the most accurate term is certainly 'the immediate given', but except for special emphasis I shall not use it, preferring the more convenient if less accurate word, sensation. Nor do I wish at this juncture to distinguish too finely between sensations and perceptions, on which point Sir John Parsons has written so well.[2] The general meaning I shall attach to sensation will be as given by James Ward: 'objective changes, as they first break in upon experience', and 'the simplest elements in our analysis of the objective factor in experience'.[3]

These sensations are to be accepted as the rough material presented to the mind for judgment. There is no doubt that they come into consciousness in a group with a certain accentuation on those which we call the strongest. Now I believe that I am taking a new departure when I suggest that, in my belief, the mind with its two centres of judgment, one instinctive and the other reasoning, does not immediately complete its consideration and come to a conclusion about any little bundle of related sensations. The process is comparatively slow, it is composite, it is not definitive and it ends in three main directions:

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[1] *Crisis in Psychology*, pp. 56, 27.

[2] 'An isolated sensation is never experienced.' *Perception*, p. 43

[3] *Psychological Principles*, pp. 114, 105.

(1) A bundle is collected, which may be assembled into a perceptual pattern.

(2) A bundle may be regarded as a confused or indefinite feeling in time.

(3) A bundle may be regarded as a permanent thought-pattern outside time.

The results in each of the three cases will tend to branch away steadily from the others of a different kind and to be substantially differentiated from them. The results of the first process, which are probably the most common because they are the most transitory, are termed images. Most of them pass away and are obliterated by succeeding images. Some of them may survive in the memory as more or less permanent perceptual patterns of a visual, auditory, etc., type. But in the human mind they are liable at this stage to pass into thoughts, if they do not become feelings, such as the smell of burning, the sound of thunder, the colour of blood.

The second process of feeling ranks as the most important in the lives of most of us. It begins when a bundle of sensation-material assumes a character of immediacy in time. All other kinds of proximity are convertible and, in practice, converted into time approximation. The knowledge that an avenger is on the path, however far away he may be, is a feeling that his presence is an immediate possibility. The arm of the law will seize the guilty man in his imagination, while he is safe in bed. The progress of fatal disease is not so much localized in the body as transformed into approximate pain and death. Feelings tend to fade like images, but many arrive at a later stage and pass into thoughts.

The results of the third process by the conversion of feelings into thoughts are more infrequent in any mind, and some minds may possibly not have them at all. We have no evidence that they are experienced by animals, though the contrary conclusion is a general inference. Although feelings are always becoming what we call thoughts, it seems to me improbable that many thoughts arise on the instinctive level and acquire a stable place in the memory, so long as they are the product of the operation of the machinery of the thalamic region. Most thoughts in order to be really thoughts must find a home in the cortical hemispheres. When they become stereotyped as representative thought-patterns we may promote them into a class to be called ideas. Their special characteristic is that they are outside time. The essential tendency of the thought-condition is to minimize and ultimately to get rid of the time-element, a process which is not easy, even in the form of ideas.

The results of the second process, feelings, greatly exceed in number those of the third process, which we have called thoughts. It would be difficult to say whether they are ever as numerous as images, which is improbable, but certainly they receive a far greater share of our attention. They are all in time and immediate time and most of them are in full consciousness, where images cannot always be. Their time character forces itself on us as their essential and importunate feature.

On the other hand, the condition of thought, although it is the third and most perfect of the three processes, is not necessarily final for any group of stereotyped and recorded sensations. Thought does not always nor easily attain stability as *thought* in distinction from *feeling*. It attains permanence as thought-idea with comparative rareness and chiefly in instruments of speculation, such as pure mathematics. Nearly every thought is capable of being revived by some added interest into the reality or semblance of feeling.

Whatever thought we may have about hunger or toothache pales before the actual pressure of the feeling of either. As Dr. Jung says, we give it more or less immediate value. We want it or another feeling to stop or to go on or to be slowed down or to be increased or to recur at a decent interval or to be merged with another modifying feeling, such as a brisk call to action in the face of imperious need.

It must be remembered that we always have compound sensations, known and unknown, pounding together at every sense and angle of the body. Gravity, warmth, rhythmic noises, stomach movements, light and sound vibrations hardly ever cease their assaults on our sensibility, even when we are deeply preoccupied or emotionalized. So long as a connected group of compound sensations remain in our psychological time, they are feelings; but when we form any opinion about them other than a time modification, they are on the way to become thoughts.

Exultation that our speculations have been successful will fade more or less gradually, so that we are tempted to go out and have a drink over it with a friend, in order to warm up the earlier sensation and enjoy it afresh. To maintain it as a feeling we remind ourselves about it all the forenoon. We may telephone about it to a stockbroker, but the event soon becomes an established fact and the feeling has passed into a thought, when we have decided to regard the increase in value as a permanent investment.

The point I wish to make is that thoughts and feelings begin alike with images as compound sensations, but with a more sustained capacity of development. At early stages the identity of none of the three is stable; each can slip on occasion into the form of another. But there is a certain natural order of progression from image to feeling and on to thought. Feelings may pass away like images, unless they become thoughts. During their early existence as thoughts they can easily slip back into being feelings once more, especially if the individual mind should enter into an emotional storm. As thoughts pass more and more out of time they get out of the reach of feeling and passion.

Advanced thoughts, such as an opinion about the range of fluctuations in Rio Tintos, in which we have no funds invested, or the date of the battle of Salamis or the idea of justice may all seem permanently out of the range of feeling, unless some chance time occurrence should bring them back, such as an examination question, the proposal to impose a surtax on unearned incomes or a legacy from an uncle.

When images become perceptual patterns, they are hardly either feelings or thoughts, although they are probably preparatory stages for both. We carry with us unconsciously in imagination useful shaped and coloured bodies to apply to each and all dogs or tables or to printed characters, etc. Also many kinds of tunes and noises and a very few tastes and smells are part of our stock-in-trade for perception, which are as frequently used when time occasions make them available for feelings as for merely selecting or critical purposes. Images, however, and patterns are not held solely at the service of feelings. Images, and visual images in particular, are more frequently used for recognition of casual acquaintances, clients and customers than for those we love, whom we know in a different way. Images of lost friends, who are dead or far away, remain curiously fixed in a single chance form, like ideas, if they are remembered at all.

The typical quality about feeling is not so much its pleasure-discomfort stress, as Dr. Driesch thinks, but the uncertainty as to whether its content is slipping in or out of time. Coming into time the content acquires at once both value and pleasure quality. Thoughts are called concepts, when they are on a shelf or in a cupboard of memory outside time. When they are, so to speak, under lock and key, we begin to call them ideas. Our daily life is crammed full of feelings, with a large number of mixed states, and now and then a thought dragged in reluctantly or finding its way in by association or casual presentation. Some people live so much in the present moment, that we call them thoughtless. The philosopher, on the other hand, tries to live, as Spinoza wished, with adequate ideas, conceived *sub specie quadam æternitatis*.

It remains for us to dispose of the difficult problem of mixed cases of a stereotyped order, which partake in different proportions of both thought and feeling. Two and perhaps three standard instances present themselves. The first is primarily a variety of feeling, receiving a permanent character from the power of will, yet having an unstable element, whenever there is too narrow a basis of thought. These are beliefs which include varieties as wide apart as delusion, confidence and religious faith. The second consists of a class of almost the most powerful feelings we entertain, such as are sanctioned with an element of permanency, whenever they can be attached to a thought and sometimes to a fixed idea. These are our desires. The third is sentiment, reaching out from desire towards emotion, which is a mixed case of different character from the class we are now considering.

Beliefs have occupied an important place in the theory of knowledge. They are the midway point between confidence in truth and attachment to error, not in the sense that they are half true and half false, but as a special mixed type. A belief may be a real belief, whether it be well-founded or mistaken. Tertullian's *Credo quia impossibile* is a famous defiance uttered, not against the supremacy of knowledge, as its paradoxical form suggests, but as an assertion of the separate identity and validity of belief in personal psychology.

With the truth or falsehood of belief I have nothing to do. We live our daily life on real, extra-conscious, unexamined beliefs, mostly concerning our state of health, the morals of our neighbours, and the validity of our current views. As any revelation of their specific untruth in any of these cases would cause a greater or less shock, we prefer to leave them unexamined. In less important ways we take things for granted, such as the good quality of clothes, houses and mental equipment, the ability of our casual associates and the probable reality and identity of chairs on which we do not sit, water in the cistern which we do not see or food in the larder, which we have not put there ourselves. In fact, we do not live on knowledge but on beliefs.

The maintenance of beliefs is more important than their individual examination; but the latter becomes necessary from time to time. Beliefs, therefore, are adventitiously linked with truth; they are maintained by will; and they are mingled with deep or superficial feeling. Beliefs are thoughts intimately bound up with a residuum of feeling. In practical affairs the feeling must be periodically renewed by verification in order to support the necessary sense of security. For instance, the source of our fresh milk must be looked upon with occasional suspicion, our water supply must be examined like the guarantees of our liberties, and we must check our pass-book to note that our account at the bank is not overdrawn.

In spiritual affairs, where verification is inconclusive, belief grows firmer without it. The particular group of beliefs, which are commonly classed under the name of faith, repose generally on a synthesis of feelings, which are outside our active life. Their influence is kept alive by recurring troubles, anxieties and the general feeling of the burden of duty. The thought element in them is not large, but it is very often well-chosen. It is very rare to find a free hand given to the spirit of enquiry or the search for truth in the network of thoughts and fixed ideas, whose foundation usually reposes on confidence in one or two individuals, such as parent, friend or teacher; or less frequently in a system imposed by accepted authority and confirmed by habit.

William James has made a study of the feeling of reality attached psychologically to faith of this kind. Some men and women inherit a special capacity for it, which is convenient in enabling individuals to prosecute without remorse or hesitation their economic, practical or ideal ends. In James's opinion the notion of reality accompanying some particular beliefs is not necessarily founded on our usual source of reality, namely verification, but to a quite different brand of conviction, which he named emotional. His judgment would seem to imply that the idiosyncrasy of violent belief is due to a perpetual reinforcement of a system of thought by waves of feeling. There can be little doubt that belief phenomena all show strong thalamic influence.

From a broad point of view desire has many of the same characteristics.[1]

Yet desires are psychologically neither the opposites of beliefs, nor the parallels to beliefs. They are feelings, originally without any infusion of will; very strong feelings to which thoughts, either suddenly or gradually, become attached. Obviously their feeling character predominates in their composition. Violent desires, like thirst, arising irresistibly from acute physiological stimulus, present the image of their potential satisfaction realistically before the sufferer and are substantially increased by the presence of their natural object. In such cases desire seems to be definitely desire for something. On the other hand, more subtle desires, destined ultimately to become no less strong, as for love or companionship, may begin with a gradual restlessness that identifies itself very slowly with any particular object.

Mr. Bertrand Russell had the latter class in mind when he wrote that the primitive non-cognitive element in desire was a *push* and not a *pull*.[2] If he had left out the word primitive, I should be inclined to agree with him. Perhaps the following point will illustrate what I mean. Take the phrase of the Psalmist: As the hart desireth the water-brooks . . .' Here we have an interesting comparison of elementary and noble desire with physiological need. I am not sure that the parallel is as sound as it is eloquent. Primitive physiological desire is very often a pull, after the avowed object has been presented by sight, sound or smell. But we can never be sure that the avowed desire has not been anticipated by prolonged unconscious restless emptiness, unaware of any object.

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[1] Allusion was made in Chapter XI to the connection between pleasure and desire, which could not be elucidated until the question of desire itself came to be considered. Desire is primarily a state of unrest seeking orientation. The direction of orientation, when otherwise unknown, is frequently described as expectation of pleasure. The prime illusion about the supposed connection between desire and pleasure is as follows: Desire is a state of unrest, where the subject reaches out for a condition A, called pleasant, the chief characteristic of which is that desire at once wants the cessation of A, in order that it may be followed by a condition B, which is usually an acceleration or increase of A. We have thus the apparent paradox, which is essentially true, that, whenever we recognize a condition as pleasant, we at once desire its discontinuance. We are thus led on to the conclusion that pleasure resembles, if anything, a time-rate or a relation between two time-rates, an inner or personal one and an outer or conventional and measurable one.

[2] *Analysis of Mind*, p. 68.

In advanced civilization, where most wants are habitually satisfied, the 'push' element in desire makes itself clearly evident. The luxurious man no longer knows what he wants. Whenever all the physiological 'pulls of desire' are quieted before they become obtrusive, a general 'push' of the system develops itself towards something strange, elusive, indefinable, unknown and more particularly out of reach. This psychological 'push' is the basis of economic value, as I have maintained at some length elsewhere.[1] In analysing desire it is probable that the thought element is rare in cases of physiological need, but becomes more important as wants grow less insistent, less defined and require more trouble in many ways to satisfy them.

Sentiment is a rarefied form of desire, where immaterial needs seem to come uppermost in the imagination. The cultivation of feeling becomes an object of the desire-feeling, yet even here the thought element finds its way into the composition of a mixed state. In all three cases of belief, desire, and sentiment, where feeling and thought are present in varying proportions, the separate constituents can be identified and one may say that each state is an inorganic mixture of both kinds.

There is another even more important case of mixed state, emotion, where the thought and feeling elements themselves are quite indefinite, passing from one stage to another. Each thought-feeling within the compound state of emotion seems to have its own history. One may hazard the simile that this kind of mixture resembles a colloidal solution in chemistry.

In attempting to analyse emotion we are approaching an emotional subject, a subject which in itself arouses an emotional state of mind. Who does not, for example, regret to lay axe at the root of the old superstition of the heart, or will not dread the reproach of the poet against 'the heart grown cold, the head grown grey in vain'? What can be found to replace the heart in rhetoric or in emotional literature? Probably not the blood and certainly not the viscera.

The viscera have been claimed as the sole source of the emotions in the most famous of modern psychological theories of the subject. The James-Lange hypothesis gave a crude version of this view, which is no longer completely accepted nor recognized as well expressed. It is, however, regarded as having opened up the way to new truth.[1]

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[1] *Psychological Theory of Value, passim.*

Experiments by Sherrington and Goltz tend to show that emotion is a cerebral function merely reinforced by sensations from the viscera. Dr. MacCurdy confirms Jung's opinion that James has stated an extreme view of the case and writes very fairly that 'were William James alive to-day he would probably formulate his views in terms of unconscious processes, of which more is now known'.[2]

It would be well here to state briefly the results of Dr. MacCurdy's own elaborate studies of emotion, merely premising the definition which he gives in the same volume of *affect*, a word which I have always found it very difficult to understand. 'Affect', he says, 'is the impression made on consciousness by active unconscious imagined processes, which do not gain any other outlet.'[2]

Dr. McCurdy links emotion intimately and indissolubly with instinct, from which emotion is developed. This development takes place in three stages. First, if the organism responds to a stimulus immediately and adequately with instinctive behaviour, no emotion whatever is engendered. Secondly, if the instinctive reaction be held up, emotional expression and, if the subject be self-conscious, some affect will appear. The latter represents the activity which is not expressed in any way. Thirdly occurs a stage in which affect alone appears, which is as poignant as the emotion is purely subjective.[2]

From the point of view of observation this analysis must be regarded as having very great authority, particularly in respect of regarding emotion as to some extent a storm of expression, or self-expression, which is alternative to instinctive activity. I cannot, however, accept it entirely from the psychological point of view for two reasons, for one of which I have authority of some great weight in support of my opinion.

In the first place instinct cannot be the sole source of emotion, which has definite intellectual elements. To accept an instinctive origin for emotion would drive us back to look for its physiological sources solely in the thalamic region. Nor do I think we can throw over all the older school of psychologists, dating from Descartes,

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[1] An excellent summary of the controversy by Bertrand Russell, who tends to support William James, is given in *Analysis of Mind*, p. 280; but the subject-matter is too elusive to be dealt with in so brief a space as he allots to it.

[2] *Psychology of Emotion*, pp. 52, 567 and 87.

Malebranche, Pascal and Hamilton, who have maintained that we have intellectual emotions. M. Ribot, who may be said to take the half-way view, by admitting that emotions have physiological conditions, would class religious, moral, æsthetic and intellectual emotions as having a real existence.[1] Dr. Herrick also writes: 'the intellectual elements in the higher emotions are cortical.'[2]

Less confidently I trace the source of the emotional storm, for in certain aspects it is a storm, not to the instinct alone, but to some collision of rival influences. The complex impulses of emotion are still rather beyond our investigation, but they seem to depend for their release on some cerebral event and for their energy on instinct with reactions of visceral origin. That is one of the reasons why I regard all the integral compound sensations, which appear in consciousness during an emotional storm and in other emotional states, as being in a wavering condition between becoming thoughts and reverting to feelings. It is possible that I read them wrongly; they may be separate thoughts and feelings in a tangle. My strong conviction from inward analysis is that we are dealing in emotion with feelings that are on the way to become thoughts and/or thoughts that are on the verge of relapsing into feelings. Let me take as an example a burst of anger, where there appears the thought: 'He is a really good fellow and consequently I must not mind what he is saying,' followed by the feeling: 'How can a good-hearted fellow bring himself to say an intolerable thing like that?'

To elucidate this difficulty I venture once more to restate the essential difference between the creation of original feeling out of primary sensation and its further reference out of time, so that it becomes a thought. At the beginning of growing consciousness there is an awareness not even of anything, nor of self, nor of light, nor of sound. The earliest sensation that follows must depend on the order of the sense stimuli, to which we have no key. When light comes our observation makes us suppose that it would be at first a violent unpleasant stimulus. The earlier sensations were probably less marked and certainly more confused. Alfred Fouillée[3] is no doubt right in supposing that primitive sensation is not an intellectual sign, but a vital sign, presenting elementary facts for cognition.

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[1] *Psychology of the Emotions* (Eng. Trans.), p. 98.

[2] *Introduction to Neurology*, p. 289.

[3] *Psychologie des Idées-Forces*, pp. i, 274.

Following the awareness, and quite possibly coincident with it, there is an opinion or judgment which goes no further than just that amount of curiosity that demands continuance or just that amount of distaste as is shown by the involuntary shutting of one's eyes against light. That opinion or that judgment is what constitutes a feeling out of sensation. It is at once placed in time and judged in time. As soon as memory begins, thought begins, if not before. The light that has passed is judged as a fact separately from the existing darkness. The existence of an absent light, that is a real potentiality, is a thought outside time, which remains quite different from the darkness that is present and is a feeling in time.

Feelings are therefore always passing into thoughts. In the guise of perceptions sensations are also passing into space and thence becoming another kind of thought outside our space and outside our time. The objects and events within my sight in a lighted room and within my hearing, such as someone playing the piano, though they are partly thoughts, are certainly potential feelings. But I may know without consciously hearing of pupils playing the piano in a school in the same street, but they can only be material for thoughts and hardly for feelings.

Emotion is generated under a complex of stimuli furnishing feelings that are allied to thoughts and recalling thoughts that are allied to feelings. It very often has an instinctive origin, but the occasion probably arises from a cerebral release. The accompanying excitement is due to a reaction of thought on feelings with a powerful clash of feelings on thoughts. It pursues a certain cycle beginning with a storm, passing into progressive stages of passion,[1] then becoming what we may call an emotional state, perhaps an affect, and lastly subsiding into an emotional interest.

Emotion can be defined as a storm of feeling mixed with intellectual elements, drawing on the resources of the whole physical system and exhausting in a single direction all the contents of feeling and thought that are generated from surrounding sensations in connection with the original stimulating thought or idea. It occurs generally under elementary conditions when feelings and thoughts are not widely separated from one another.

As it has, like instinct, a strong practical aim, emotion is a storm with a definite direction, tending towards an affective or passionate state, whose essential purpose consists in being communicated to others. When its object has been achieved it does not persist. It is in general an alternative to action and it may often exhaust the strength, which would otherwise lead to action.

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[1] Passion, so-called because the conscious self is almost a passive factor in the grip of uncontrollable feelings and forces.

Its material consists of compound sensations, which are in a half-condition between feelings and thoughts. If the general current of the storm converts the sensations into feelings, the storm increases. If the sensations tend to become thoughts the storm subsides. Sensations transmitted through the thalamic junction to the cortex become thoughts very quickly. Sensations passing to the thalamic end-organ are converted into the thought stage very slowly, if at all. The stream may be influenced by secretions from the pineal gland, the exact nature of whose operation is unknown. It is said to belong to the para-sympathetic or autonomic system,[1] which is to a large extent beyond the control of the will. On this hypothesis the influence of emotion on the viscera would take place in a downward direction, and visceral changes would seem to be dependent on original cortical release and not vice versa. No doubt, as Sherrington and others have said, the reactions occurring instantaneously in the viscera would at once exert a return influence through the thalamic system to the cortical region.

The close alliance of emotion and instinct is well known. It is probable that instinct may have a controlling power over emotion, because the tendency for emotion to exhaust itself in expression alone is well known to be unfavourable to action. It appears, therefore, that emotional impulses may pass away in three directions: (1) in mere expression, where they are calculated to influence others directly or indirectly; (2) by passing to the thalamic end-organ, where, as a matter of pure hypothesis, they may be inhibited by the instinctive faculty in the interests of practical efficiency; (3) by being transmitted to the cortex, where they may be intellectualized and damped down by the reason.

The process of control or inhibition may well be deduced by inference and observation. It is sufficiently apparent by slight indications in strong characters, where fear, anger and demonstrations of affection are repressed in order that action may be rendered more effective. In other words, the forces, which are mastered in an emotional storm at the outset, are withdrawn and reserved, while the whole system is stressed in cool preparation for flight, combat or policy. The organism may then be reinforced by secretions from the ductless glands of the thyro-

[1] E. Miller, *Types of Mind and Body*, pp. 8 and 70.

suprarenal system, which act with great suddenness and efficiency. Among other things they affect the supply and the pressure of the blood by closing certain circulatory paths and opening others to a fuller infiltration. They also increase the supply of sugar to the blood and augment the conductivity of the brain, all physical changes promoting the rapid development of efficiency.[1]

Many thinkers agree with McCurdy in considering emotion to be a product of instinct or even in identifying it with instinct. What negatives this view to my mind is the intellectual element in emotion in man. The direct purpose of the emotional storm is to effect a practical conversion in other minds by communicating feeling. Not only shouts, angry glances, tears and sighs are employed, but outbursts of words, written communications, art products, music, drama, song and poetry.

Emotion finds a direct vent in all these outpourings, which are purposive. To use a convenient phrase, emotions are not only eloquently conveyed in literature but sublimated by artistic expression. I consider, therefore, that the generation of emotion is not solely and specifically instinctive, though the control exercised over a useless outburst of emotion is undeniably instinctive, even if assisted by cortical criticism.

In the history of thought, sublimated emotion plays a conspicuous part. It is the great communicator of feeling, consciously and unconsciously, the generator of emotion in other minds. Art is the vehicle that conveys to others a suitable train of thought, to lie waiting in their memory for the cerebral spark in order to start an emotional storm, a fiery whirlwind of hot enthusiasms, fed by the instinctive energies of feeling which is half thought and thought which is half feeling.

It is a mistake to think of an enduring feeling. The most lasting of all mental states, resentment, is not a perpetual feeling carried to the train every day, swallowed with tears or scorn at every meal, disturbing the digestion, poisoning the springs of enjoyment. It may be so represented in fiction. In reality it is an elaborate train of thought, whose details are carried in the memory. If really enduring, it is fed by reminders, accidental or purposive. It awaits revival by the presentation of the appropriate thought on a suitable occasion. Griefs are automatically and often willingly revived by recurrent associations, which renew the sense of loss. They are most commonly sublimated in the event by resignation, or some noble form of emotion that is intellectual in character.

[1] E. Miller, *Types of Mind and Body*, pp. 54 and 61.

Hartmann, who had many good ideas that he never worked out, used to maintain that feelings were a kind of thought, but this simplified view is not tenable. Some kinds of thought barely pass through the stage of feeling, because they are engendered on the verge almost outside time. It is still more true that many feelings never become thoughts, because they are too fugitive. Whenever they do, they change their nature and become radically different.

Let us reconstruct the process. If we conceive of an organic group of related sensations as bound together in some compound form, which is not a percept nor an image, we might provisionally call it a compound of fact or a unit of the immediate-given. Such a unit with some element of persistence, whether it be called a concept or a fact, presenting itself to a mind, forces that mind to take up an attitude towards itself. So long as the mind regards the unit-fact as present to or in contact with itself in time the mental attitude is that of feeling. When the mind begins to place the unit-fact away from itself, as it were, outside of immediate space or time, the mental attitude is that of thought. One attitude may pass quietly into the other. Conversely some kind of thought-units may easily slip back again into the feeling condition. Thoughts which are far away from all possibility of again becoming feelings are apt to pass altogether out of reach, a feature of mind which will be considered in the next chapter under the form of memory.

What seems clear is that there is no organ that deals only with feelings, as was usually supposed to be the privilege of the heart. Nor is there an organ reserved solely to thoughts, such as the head. The skull, as we shall probably find, and more particularly the cerebral hemispheres, contains the only seat of memory on a large scale, because of the ample provision of cells in its grey matter. In this special respect of storage capacity it has very nearly a monopoly.

If there ever had been any original tendency to segregate either feeling or thought in the upper brain, it would be modified by the facility of communication between the cortex and the thalamus. The relegation to their rightful sources and destinations of the various departures and transits of sensations, impulses and reflections in all their complexity between the thalamic and cortical centres of mental activity is not an easy problem to resolve.

The tangle of complications, however, are not insuperable and their unravelling will be aided by our study of the physiological aspect of the question. The problem is not really so complicated and remote as that of memory. It is made easier by bearing in mind the weighty share that must be played by memory in facilitating the transformation of new feeling into thought by collation and comparison with similar mental phenomena, which have become thought already.

We may therefore safely conclude that the cortex of the cerebral hemispheres is more favourable to the development of thought, while the thalamic junction with its complicated nuclei is chiefly occupied with the arrangement and co-ordination of feeling. Yet the upper brain certainly has its own feelings and possibly the end-organ of the thalamus has its own few thoughts and some form of crude memory. It is usual to credit the instinctive faculty with strong and even obstinate opinions, to which it would be difficult to refuse to concede altogether something of a thoughtlike nature.

Further conclusions on this difficult point must await new achievements in the discovery and elucidation of all the detailed paths of communication between the special nuclei of the latter with the various convolutions of the former. Some beginning of this task will be attempted in Chapters XVII, XVIII and XIX. For the present we must content ourselves with asking what are the relative and comparative capacities and what the respective attitudes of the separate groups of sensory and deliberative organs in the thalamic and cortical regions respectively towards feelings and thoughts as a whole?

Both probably entertain both. With feelings the thalamic region, for reasons of physical contiguity and for purposes of physical control by means of its relaying machinery, must necessarily be more intimate. So far as we know, only the sense of smell sends its messages without mediation to the cortex. The thalamic end-organ is nearer to the inrush of the sensations which make up feeling, it is far smaller, and it has certainly less time and less apparatus for thinking. It would have less opportunity and no temptation to regard facts and perceptions under the single dome of eternity.

Such a conclusion would be in accordance with popular opinion. For high thinking, for the manufacture and manipulation of thoughts and ideas, for the activities of the faculties of reason and intuition, the cerebral cortex has almost as great a monopoly of function as for the preservation of memory.

No more than in their organs is there any introspective evidence of duality in thought and feeling. So far from discovering any proof of the existence of duality and antagonism between them, we seem to recognize in the units of compound sensation something that seems to be a fluidity or unstable identity between feelings and thoughts and reciprocally between and from thoughts to feelings. It is difficult to give any other name than fluid to the apparent capacity for feelings to be transformed into thoughts by the action of the mind in lending them a less immediate but steadier form of attention, or for the tendency of thoughts to be revived into turbulent activity by the appearance in consciousness of some new and fiery idea or imperative sensory call, beckoning them back into the circle of limelight, where the day-to-day feelings of the mind receive their fervid and periodical inspection.

There are various terms in ordinary and philosophic language indicating degrees of remoteness of thought or thoughts from feeling. Perception is hardly thought, but percepts or the results of perception, after being images, often pass into thoughts. Cognition is the ripening and crystallization of thought about whatever is given in sensation that deserves more than passing interest. Cognition carries a large proportion of the immediate-given beyond the circle of feeling and produces stable mental objects, which are called in philosophy, 'particulars'. By contrast with this term any group of objects having a character, which may be identically shared by many 'particulars', is called a 'universal'. Thus we come by inclusion of indifferent characters and exclusion of all personal feeling and time-attributes to reach the rarefied kind of thought known as 'abstract general ideas'. It is well known that the application of 'abstract general ideas' to 'particular' objects or situations has a cooling effect on both feeling and emotion.

Before I pass on to the broad subjects of memory and consciousness in the two following chapters, I should like to refer to some special characteristics of thought and feeling, which will come up for discussion later on. One of the ways in which thought differs most profoundly from feeling is by the methods of communication, which are used to transfer knowledge or transmit feelings from one individual to another.

Thought uses overt and verifiable ways of communication, signs, language, writing, literature, tradition and some forms of art. Feeling uses signs and emblems more sparingly and only emotional forms of art, but chiefly spoken words and various methods of personal contact, such as facial expression, tones of voice and more rarely inarticulate cries.

Where contact is slight, as in a crowd, the emotional indications are almost imperceptible, yet intercommunication is frequent and powerful. Where contact is absent, feeling and emotion are propagated by suggestion. Sometimes the suggestion is carried indirectly by sympathetic forms of literature and art. Sometimes it is transmitted telepathically, extra-consciously, in silence and without any sign. The evidence of telepathy has become convincing to a large number of observers. It is of vital importance in political, social and economic life.

NOTE I

The relation of thought-feeling to time and the reference of all essential differences between thought and feeling to time only may be held to be obscure and is in fact obscure. The differences themselves are obscure.

The primary objection to this distinction, a strong one to which I have not felt able to do justice in the text, is that the most powerful element of feeling seems to be self-relevance or nearness to the self. Unquestionably that is true, but relation to the self, near or far, is characteristic also of thought as well as feeling. The only line tenable between the two would be something resembling a local boundary. How can one use even an imaginary boundary in fact between feelings of self shading off into thoughts of self and abstract thoughts gradually taking on a personal application?

The time element is not easily used as a distinction, but it is valid. If I use the word 'bed' and think of (1) the bed I sleep on, or of (2) the bed I shall die on, I place both associations in different degrees within time. Now since dying seems far away in youth and near in old age, (1) and (2) will bear different degrees of feeling to the young and to the old. But it is possible to think of beds in shops and of beds in museums, going further and further off, until I come to the 'universal' bed, which would be thought without feeling, because it is outside time. The relation of two parallel lines is a thought, until I place them on railway lines, when they will begin to creep into time and assume an interest, which is a kind of feeling. It is difficult to keep thought and feeling together, and whenever an individual gets the reputation of harbouring many thoughts and becoming intellectualized, he is credited with no feelings by the vast majority of people.

A more real, if more subtle, objection to using the degree of self-relevance for a criterion of the identity of feeling, as compared with that of thought, is that the self is one of the most elusive of all the identities with which we have to deal. Our consciousness of personal time or comprehension of 'duration' is only one of the elements out of which the self is built up. Realization of extension is another. There are possibly others of which we know nothing, such as may be contained in a fourth dimension.

Suppose, then, that we were to say that the essence of feeling depended on self-relevance. That would mean that feeling depended on (1) time,

(2) extension, and (3) etc. Of all these the most personal element I believe to be time, extension being the vehicle, where other than personal elements begin to assert themselves.

Extension cannot be used as a criterion, because we can love ideas and images outside space, but we hardly love them if we place them outside time. Love brings the idea of a loved one back into time, the time of oneself. Time might be, in fact, roughly defined as the application of thought to extension, with a view to bringing extension into personal relation with the self and thus importing feeling.

The sum of three angles within a triangle is inside space and outside time. The idea of it is a thought, and cannot conceivably be an object of affection or feeling to anyone or anything, which is not a self-conscious triangle. But in that case, as Spinoza said long ago, the God of a triangle would be a triangle.

To accentuate the idea of time as being the critical arbiter between the mobile conditions of mental-feelings on one side and mental-thoughts on the other is probably to put one's finger on the great mystery of life and of our own physical duration.

Our own subjective time is measured by two things: (1) the number and rate of our personal pulsations, vibrations, etc., occurring in the mechanism of our physical existence; and (2) the amount of conscious attention we give to our own time-rate, which slows down as we observe it and increases in rapidity up to a certain psychological point, where it maintains evenness, if we leave it alone. In the absorption of great joy it probably goes at a rapid rate.

This real personal-time has to be brought into some kind of conventional relation with the time of the days, months, years, and centuries. The stability of the conventional relation is a matter of theory. It is enforced in practice by the necessity of synchronizing the habits of a large number of people living together. The natural measurements of time supplied by the heavenly bodies with their light periods and seasons are multiplied by mechanical subdivision and measured along suitable extensions to a degree that their accuracy is psychologically imposed upon us. We are taught from childhood to imagine that all astronomical time is real time. Such is not, however, the case. All real time is subjective and remains within ourselves. See also note on perception of time at the end of Chapter XIX.

NOTE II

It would be out of place to attempt here a more precise definition of even so important a psychical state as emotion. Just as the will includes a series of formal action-patterns, which it creates for itself by executive power and stereotypes by habit, so the emotions create and re-create various sense-patterns, each a series for itself. Both the will and the emotions also borrow their patterns by intercourse with others and largely from literature and tradition.

CHAPTER XIII

THE DUALITY OF MEMORY

MEMORY has lately been a tortured subject. There is not, however, so old a literature upon it as we might reasonably expect. Perhaps this is because it seems to have been for long treated as a branch of the intellect and to have been taken for granted. The idea of memory complications having a physical origin has only seriously seemed possible since light has been thrown on the minute subdivisions of matter.

There are two mysteries about memory. The first concerns the problem of how we remember and the second is how we forget.[1] It has been argued that we really forget nothing, that everything is retained in our unconscious or extra-conscious memory. It has also been argued that no brain could physically hold the traces of all the facts and images with their infinite variations that many of us can obviously remember. Neither extreme view seems to be at all probable.

With regard to the first it would imply that, if we remembered everything, we should retain subconsciously for every correct and recent impression a far larger number of wrong and obsolete ones. Somewhere or other we should be carrying extra-consciously innumerable views of every face and of every time we have seen it at every angle, that besides every right version of a fact we should retain many mistaken ones, and that the same fact, word, tune or smell would be included several times over in our real impression-records, because a forgotten fact would be a mental fact, even if it be a different kind of mental fact from a remembered fact. The resulting confusion seems to me unthinkable. It is undoubtedly more reasonable to suppose that for most objects and many ideas we own a frame or pattern into which all convenient subordinate details can be fitted, while the others are rejected. The pattern is necessarily subject to frequent correction, but it would hardly fulfil its function, unless it imported some method of securing a kind of provisional finality. It follows that for any one detail that we remember a dozen must be rejected and suppressed.

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[1] The mystery of forgetting would not present a difficulty to some people according to a story repeated to me by Sir Owen Seaman, the editor of *Punch*. He overheard a Hyde Park orator paraphrasing Talleyrand: 'the aristocrats', said this pundit, meaning presumably you and me, 'are like them Bourbon kings,—they forget nothing and they remember nothing'.

With regard to the second contention, part of the difficulty is removed by the acceptance of the theory of rejection and suppression. The other part of it becomes a physical question of the divisibility of matter. Given 9,280,000,000 cells in the human brain, a good many separate direct conditions and a far larger number of relations are possible. As for intercommunication, each cell may have up to a dozen contiguous neighbours. There are also from 30 to 40,000 commissures or fibres for long-distance connections. For close connections by immediate contact the number of cells can be multiplied by ten for the factor of contiguity and, when the possibility of long-distance connections is added, the number of permutations and combinations will work out to a comfortably large figure. There is no reason to suppose that we have rightly comprehended how minute the modifications of each cell might be, but there is in the sum-total of them a wide margin for large multiplications of varieties.[1]

It is equally a mistake to set any limit to complexity or to underestimate how large a draught on this complexity will be required for the purposes of thought. If we were to add together all our really present but extra-conscious recorded survivals of the past, and include all our equally really present and extra-conscious mental processes now going on within an adult brain, comparing

[1] Since the text was completed a very much later count of the neurons in the grey matter or cortex of the human brain was recently quoted by Sir Arthur Keith in a lecture before the Royal College of Surgeons. Professor Constantin Economo of Vienna claims to have counted or estimated on a counting basis the number of neurons in a superior European brain of 48 ounces, and reckons them in round numbers at fourteen thousand million, which greatly exceeds any previous calculation. Sir Arthur Keith also supposes that any single neuron might have direct physical relations with its near or far compeers by perhaps 100 filaments, most of them having terminals in the neighbourhood and usually one long process or filament to make distant contacts. It will consequently be apparent that I am safe in saying that any present statement of our complications in memory traces and their associated connections can easily be an immense under-estimate, but is certainly not an exaggeration.

them with the sum-total of all that we now know of as consciously going on within us, and then describe the proportion of all outside events to all events inside the circle of consciousness as a ratio of one million to one, we might be overstating it, but it is quite possible that the error might be really the other way. Our means of information and inference are so small that the figure is evidently a fancy one. It is large enough to make us realize that the processes of (1) suppressing, but not altogether dismissing past all voluntary recall; (2) retaining out of consciousness, but within easy reach of associational recollection; (3) forgetting, but not beyond accidental recall; each presents a problem more difficult than that of (4) maintaining a complete hold of everything in consciousness.

It is not surprising that magic has been pretty regularly called in to deal with the more perplexing features of the memory problem. I will not dig up any of the old ones, but in their place in the present chapter I will discuss only two forms of it. The first, by throwing part of the causation of our memory traces on heredity, seems to me only to aggravate the difficulty involved in having to explain the overcrowding. The other is quite a modern version of an older metaphysical explanation and I do not hesitate to say that I see no evidence or justification for it.

A plausible explanation from the physical side has been attempted by way of minimizing the difficulty. It is suggested that part of the responsibility of memory may be delegated to the major and minor motor centres. Just as the automatic control of the heart, etc., is recognized as belonging to the autonomic system working with a very considerable amount of independence in correlation with the sympathetic system, so various motor centres are credited, not only with a ready-made machinery of effective reflex movements, but with a small amount of adjusting intelligence and a considerable capacity for storing up the results of past decisions and for benefiting by the experience of executing past movements. In other words, they are allowed or credited with a certain amount of kinæsthetic memory.

In dealing with the unconscious and extra-conscious independence of local nerve-centres in the next chapter, a little more will be said about this autonomous form of proconsular activity. For the theory has taken on considerable proportions. No one quite knows how far it is to be carried. To begin with, it appears that nerve currents—or whatever the form of impulse is said to be—have a way of improving their own paths with practice. A German word, *Bahnung*, has almost become a technical term to denote such a process of facilitation. How far memory can be allowed to exist in these methods of facilitation it is difficult to say. It would be rash to deny the name altogether, while we cannot admit that there is much to justify it.

M. Ribot has included a theory of motor memory in his wider theory of unconscious phenomena. He modestly calls them: 'dispositions fonctionnelles résultant d'une répétition des expériences.'[1] None the less it amounts to memory of a kind, when the deposits of motor experiences have unconsciously the power of reproducing their former mode of action. For all its lazy plausibility the theory totally lacks confirmatory proof. We can go no further than admit its possibility in our present state of ignorance. There is no more positive evidence for it, and possibly even less than we may have for a kind of memory in the spinal cord or in the thalamic region itself. In both these latter situations there exist groups of cells to be found in the grey matter ready to act as the kind of instrumental mechanism to which we are accustomed for mental purposes.

It seems that we must substantially attribute the work of memory in bulk to the capacity of the cortex of the cerebral hemispheres, and not quarrel with received traditions until we are forced to do so by very strong inferences. For the same reason we can reasonably depend for most of the phenomena of recollection on the working theory of the association of ideas, wherein memory is certainly served by the commissures or association fibres traversing the intervening space between the lobes of the cortex and by the contiguity of cells in the local groups. Although absolute proof of complete localization of functions in the cortical convolutions is wanting, the general fact of localization of certain psychological capacities must be substantially admitted. Association of thoughts, especially by means of words and language, is facilitated by contact of cells and by multiplication of crossed paths. It is difficult, if not impossible, to frame a working theory of memory which does not rely principally and probably wholly upon physical traces,[2] as being the efficient instruments of memory.

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[1] *Vie Inconsciente*, p. 58.

[2] By the term, 'physical traces', is denoted a hypothesis of plastic paths made in the grey matter of the cerebral cortex and in similar human material elsewhere. It is supposed that these traces are durable enough to survive indefinitely during life and yet they are not so rigid as not to be suitably modified by recurring neural discharges made locally by similar memory occurrences.

Whenever the complex of stimuli present a resultant involving all their implicit conditions, not only the final complete effect produces a reaction in the receiving brain, but all kinds of minor reactions are encouraged or brought in by the separate parts of the process. Memory has to work not only as a whole, but as the representative of its constituent parts. The recurrence of part of the stimuli of any group tends to cause the recurrence of the whole of the reactions.

Yet that is not the whole work of 'association', as it is called. The sum of the reactions may come up as a whole in the same order or in a different order, and every variation will create a new fact with a new order and import fresh facts to alter the old order.

Every one is acquainted with psychological manipulations of association by employing artificial *memoriæ technica* to reverse the process of association of ideas. In my young days a well-known Professor Loisette was a popular teacher of very useful methods of that kind. But most of us depend for working purposes on association by interest. For very sensational methods by lightning calculators it appears that instantaneous imaginative pictorial representations are cultivated.

When we come to review the capacities of the cerebral hemispheres for carrying records of past histories, our own and perhaps those of others, we must begin to turn our attention very carefully to terms. The question of whether we do or do not inherit past memories from our ancestors has to be carefully distinguished from the traces or records in memory of our own history. Two influential thinkers, the late Samuel Butler,[1] and Dr. Semon,[2] maintain that some memory comes to us in an inherited form. To this form of record Dr. Broad [3] has given the general name of 'dispositions' to distinguish them from records of our own experience preserved in minute physical modifications of brain-cells, to which the general name, 'traces', has been usually given. Something like 'dispositions' are described by Dr. Semon, under the special name of 'engrams', which he holds can be inherited.

The question of heredity is really far more important in dealing with modifications of structure, associated with the faculty of instinct, than for any special relation it has with memory. Consequently I do not propose to reopen here the issue as to whether acquired characteristics can be inherited. I merely wish to point out that if dispositions and engrams are inherited, they can only be transmitted in some minute form comparable to physical traces, and for that reason it will be well to follow Dr. Broad [1] in adopting some general term to include both and all of them, which he has offered us in the phrase, 'mnemic persistents', to express all that we know about traces and dispositions.

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[1] *Unconscious Memory.*

[2] *Die Mneme* and *Die mnemische Empfindungen*, translated by Vernon Lee.

[3] *Mind and its Place in Nature*, pp. 358, 360, 388.

Now the difficulty of supposing that we carry all our traces, like scars, in our heads has tempted some people to put some of the traces or their equivalents outside our heads. From this point of view let me point out that any hypothesis of inheritance does not lessen the physical difficulty but decidedly increases it. We have to imagine ourselves carrying somewhere, inside the cortex or out of it, the whole sum of mnemic persistents, including our own records. Suppose we adopt the common metaphor of 'boiling down', often usefully applied to arguments, we shall have to picture an endless series of separate and similar processes of reduction, not only for our own traces but for all those that we inherit in the form of dispositions. The immediate and perplexing question arises as to how far this vista of successive reductions of memories and experiences should be carried back in any individual history.

It must be recollected that our own dispositions or ancestral traces would have been under this theory successively reduced again and again from a long line of ancestors, so that we are forced to recognize that we come back by a roundabout method of argument to accounting for the inheritance of acquired habits as instincts and to placing the traces of them in the cerebral hemispheres. The two arguments are identical in substance, and in form the memory argument is the more clumsy of the two. The reduction of our own traces with all the records of our own experiences to a manageable compass will be, as I shall presently show, a sufficiently difficult process to explain. I refuse to believe it possible that all supposititious mnemic persistents can be accounted for in the same fashion.

The framers of fanciful explanations, based on no evidence of structure, often claim for themselves a superb quality of imagination. I should rather credit them with a certain laziness of imagination in refusing to work out for themselves all the detailed consequences that their suppositions would involve. They are asking us in the sphere of memory to multiply for ourselves by the number of our influential progenitors all the separate difficulties of selection, forgetting and suppression, which are hard enough to explain in our own single brain. If we fancy the memory quarters of our brains as coming to us, not as plastic receptive organs but already furrowed by centuries of irremovable dispositions, we deny ourselves reasonable capacity for originality and development.

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[1] *Mind and its Place in Nature*, pp. 359, 388.

It is not the problem of finding space and separate quarters in a physical cubic content that daunts me, it is rather the psychological unravelling of the methods of handling them that appears to me to outdistance the imagination and to prohibit belief. If we regard our brains, not as adapted and plastic organs, but as carriers of rigid disposition-traces, every stage of inheritance would demand its own special process of reduction, as well as individual method of transmission. Nor can I see any evidence within or without the body to justify a hypothesis which seems to be founded either on prejudice or some deep unreasoning desire.

It is not difficult to realize the nature of the desire which prompts our instinctive intelligence extra-consciously to grasp at a theory offering an apparently speedy amelioration to mankind. Nature seems slow in making her improvements in the animal and human frame. Each generation would wish to hand on its own experience, not only by tradition, which the young can easily disregard, but by adapting our frames and our brains in our descendants. The battle which is continually waged by many to maintain their faith in the inheritance of acquired characteristics is being extended from the outward to the inward man.

As a matter of simple theory, if it were tenable or provable that memory traces or some sublimated edition of them, modulated heaven knows how, could be transmitted and inherited from one generation to the next, would not the evidence for its reality be overwhelmingly present in much more sudden reversals of human nature than any of which there is any record? It is no argument against it to say that any strong tendency to inherit very rapidly, that is to say in a few generations, an accumulation of memories and experiences might be quite disagreeable to the non-consenting receiving posterity, who resent sufficiently sometimes the actual conditions under which they come into the world. It is, however, an argument against this particular aspect of transmission to say that, on the whole, it does seem a great blessing to the human race to have a fresh start in many ways with every succeeding step in descent or ascent towards freedom from encumbrances. I believe that the human brain begins unscarred in each new life as a complex but plastic instrument.

The hypothesis of inherited memory is, strictly speaking, a theory of extended natural memory. It postulates some form of specialized traces and, wherever the inheritance of traces is not included in its statement, it becomes a metaphysical theory. Let us turn to Dr. Broad's authority for a statement of the 'trace-theory', in which I gather that he provisionally believes, until more definite evidence is forthcoming. 'The trace-theory holds that the past experience is not an independently necessary causal condition of the memory of it; and it has to fill the gap by postulating hypothetical microscopic entities, viz. traces, which are produced by the past and persist into the present.'[1] In my opinion natural memory can be described in no other way.

Dr. Semon has elaborated with engrams a complicated machinery of mnemic phenomena, which might be passed over, if they had not been taken up under the name of 'mnemic causation' by Mr. Bertrand Russell.[2] I cannot see more in it than a kind of mystic bridge, carrying any present mental state, viz. the state of any mind receiving a presentation or representation of a past real event, back over any traces to be refreshed by the original occurrence. As it seems to me extra-natural and unsupported by any evidence, introspective or otherwise, I agree with Dr. Broad's exhaustive criticism of the doctrine.[3]

If we are to rely on a mystic or metaphysical theory of memory or at any rate on a kind of automatic-intellection theory, one end of which hangs in the air without visible support, it seems to me that a much better case for its necessity is to be found in Descartes and in Professor Bergson's minute and eloquent study of all mental mnemic phenomena. Professor Chevalier quotes Descartes as making a distinction between mental acceptance of a presentation and the intellection brought to bear on this stimulus by the mind itself. The two mental phenomena are carried into the future in a different way, but the method of the second process is not described. 'Tandis que la mémoire des choses matérielles dépend des vestiges qui demeurent dans le cerveau, pareils à des plis dans un morceau de papier et qui le rendent

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[1] *Mind and its Place in Nature*, p. 450.

[2] *Analysis of Mind*, pp. 83–7, 207, 219.

[3] *Mind and its Place in Nature*, p. 441.

propre à mouvoir l'âme en la même façon qu'il l'avait mue auparavant, la mémoire des choses intellectuelles dépend de quelques autres vestiges qui demeurent en la pensée même et sont d'un tout autre genre que ceux-là.'[1]

Bergson's views are contained in a brilliant rhetorical treatise, which it is impossible to paraphrase or to quote at length; so I must content myself with a short quotation, which seems to me representative. 'Il y a . . . deux mémoires profondément distinctes: l'une, fixée dans l'organisme, n'est point autre chose que l'ensemble des mécanismes intelligemment montés. . . . L'autre est la mémoire vraie. Coextensive à la conscience, elle retient et aligne à la suite les uns des autres tous nos états au fur et à mesure qu'ils se produisent, laissant à chaque fait sa place et par conséquent lui marquant sa date, se mouvant bien réellement dans le passé définitif et non pas, comme la première, dans un présent qui recommence sans cesse.'[2]

Of the first memory I gather that its content must resemble that of the memory of Descartes and more remotely the motor memory of M. Ribot. It distinctly depends on traces some of which may be in the brain and some in the body, but without any severe line being drawn, as to which group belongs to which part of our general organism. It seems to me at first sight as if it were treating so noble an instrument as the brain most unfairly to leave its share in the work quite undefined and almost indefinite. Inferentially only a comparatively small amount of traces are assigned for the occupation of its vast material organization.

It is the second immaterial memory of Bergson, which keeps separate representations, each in its place and with its own unforgettable date. On this hypothesis the true memory would reveal to us, if we could only question it aright, the temporary individual appearance on every separate occasion of all our children, parents and friends with concomitant voices, words, fragrance, pressure and embrace. How is it, then, that we are apt to have the curious experience, that those in closest touch with us, emotionally or otherwise, present themselves usually in forms less distinct than other images of people far more indifferent and less noticeable? Is it that the true memory denies us satisfaction in proportion as we most desire it on occasion and why is it that it should be more capricious than a motor memory?

While I feel ready to entertain a general argument in favour of a double memory, my most serious criticism of Bergson's form of it must be directed against his unexplained differentiation between a memory, which stoops to use material instruments in certain cases, and another class of memory, which is posited from the beginning as being superior to all known instrumental methods. To deny any causation, agency or instrumentation to or on behalf of any kind of memory would be more consistent and logical. To contend that one method of operation is easy and obvious, while the other is so much above us that enquiry into its origin almost resembles impertinence, suggests to me a want of respect for our human reason.

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[1] *Vie de Descartes*, p. 233, note.

[2] *Matière et Mémoire*, p. 164.

A memory left hanging unexplained outside of space seems to me a metaphysical memory. Let those who will believe in it.

I am not denying the fundamental probability of a duality in memory, as a phenomenon, which needs to be examined and elucidated. The doctrine of mnemic causation working side by side of traces and records to supplement their action also points in the same direction of duality without so clearly indicating it. The strong point underlying Descartes' hypothesis and others resembling it lies in the criticism implied by both, that one ordinary instrumental trace-memory does not seem sufficient to carry all the burden of work involved in our known aggregate of mnemic phenomena. It gives us a suspicion that a search is necessary for the second half of a dual memory to account for all the facts which are already clear to us. There is no reason to suppose that, if the first memory has to depend on traces, the second need be or must be presumed to act without them.

There is some slight evidence from observation of permanent double memory, not enough to justify a definite hypothesis, but perhaps a fragment enabling us to presume an explanation of certain difficulties. There is an obscure case mentioned in *Matière et Mémoire*, reported by Grashey and studied by Sommer, in which a patient suffering from aphasia seemed to be making movements which resembled signals addressed to an independent memory.[1] The case for a double memory is not, however, an inductive one from experiment or observation of behaviour. It must be drawn by introspection from individual analysis of our own recognized mental conditions.

How is it, I will begin by asking, that our clearest images of facial expression or reproductions of tones of voice so often lie in single figures far in the past? We say of them that they 'stand

[1] *Archive de Neurologie*, XXIV, 1892.

out' singly against a grey past. They are not overlaid with later versions of the same subject. They are not really single, because they often recall someone long dead, who was formerly familiar enough in life and must have been frequently repeated in numerous phases which were long ago dismissed. Yet the surviving image seems single and, because it is single, it stands out with terrific clearness.[1] The explanation is that the individual representation has shaken itself clear by time and/or emotion from all pattern-effects, that it is no longer overlaid with fugitive resemblances each modifying the original a little and that probably it comes back so seldom as to be past the danger of being blurred or slurred.

The key to an explanation lies in the word pattern; but not any pattern only of the visual kind. The word required should include something like a frame in two and also in three dimensions. It should sometimes resemble a composite photograph, sometimes a string of words in a certain order or of notes in a musical phrase. It should not be a single standard idea to be applied to an outside bundle of sensations, but is rather in the nature of a collection of quasi-cupboards, some of a visual or auditory order, others of logical, literary, social and ideational type, into which incoming groups of sensations should be instantaneously placed.

My belief is that everything coming into the field of an ordinary mind with some elementary cultivation is received automatically by two memories which, if not part and parcel of sensation, are its instantaneous concomitants. The primary memory receives the incoming compound in all its hideous and incongruous details. The secondary memory passes the compound through or in a selecting medium, which we may call a pattern. The selecting process of the second stage is all-important. For all its rapidity it is most probably conducted in stages. All the compounds find their constituents selected again and again.

Some of the frippery is probably winnowed out extra-consciously in sensation, as has been suggested by Mr. Van der Hoop. It is difficult to imagine that something of this sort is not done, for instance, in music. Much more selection is certainly effected in the following stage of perception, as has been conclusively demonstrated for vision by Sir John Parsons. Mr. Bertrand Russell testifies to the same effect quite as definitely in other fields: 'It is only the psychologist or the skilled observer who is aware of the large mnemic element that is added to sensation to make perception.'[1]

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[1] In this way I remember Bradlaugh and Gladstone in the House of Commons in the year 1886, and Bradlaugh far better than Gladstone.

The degree of selective power in any mind certainly depends both on its general cultivation and also on its expert knowledge on the given subject in any issue. We come across some astonishing memories from the point of view of capacity, whose value is commonly overrated. They seem to need and to exercise no selection at all. The brilliant performances of such a phenomenon are deceptive as are those of a very comprehensive memory. It is generally found that a wide range of moderate accomplishments makes the memory averse by habit to any process of selection, so that the choice becomes too catholic. An agile language memory is rather opposed in principle to a strong logical memory.

It is not, however, the original selection made by the two memories that constitutes their peculiar character. It is the persistent process of refined and repeated selections, which are extra-consciously continued after sensation and perception in each memory, which differentiates them and carries them apart from one another. The capacity and intellectual rank of each memory depend upon its power of discrimination in the first place, on its retentiveness in the second and on its method of forgetting in the third.

It will facilitate the separate consideration of the two memories if we can give them provisional names. The first businesslike or workmanlike memory is like a table-drawer full of letters, stamps, pencils, sealing-wax, string, etc., or more probably like a schoolboy's pocket, keeping a number of things which are potentially useful. There is no logical or pattern selection. Sensations are retained by odd association, such as a collection of moustaches, bald heads, dreams, dogs, landscapes, fishing-tackle, stamps, handwritings, smells, tunes, initials and so on. Some of these are dropped at once, if not used in three days, others are kept like photographs in an album. How the forgetting is done, no one knows. But it is extra-conscious and it is always going on. Every minute, every hour, every week a fresh batch of sensations is dropped and a fresh method of economy is practised in taking up. We not only learn how to forget but also how not to take up.

The second reserve memory may be called a pattern-memory and far less forgetting has to be done here. Extreme economy is exercised in taking up and every image is verified and reverified in accordance with some extra-conscious plan. We see a certain dear face a hundred times a week and we keep its memory liquid, always adding a little and dropping a little, while we think it is the same face all the time. We also carry a map of city streets with restaurants, fashion shops, sunshine, green trees and wet pavements, which is altered every time we go out.

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[1] *Analysis of Mind*, p. 237.

The mystery about the reserve memory is not so much how it forgets, since it is very tenacious, but how it keeps in touch extra-consciously with the workaday memory. It is always stealing things, so to speak, from the work-table drawer. As it gets fuller and fuller of tunes and tones and voices, of smells and tastes, of images and ideas and philosophies, it may be puzzled how to arrange its stock, but it seems to drop very little. It economizes its strength not by forgetting but by selecting more and more carefully just the right kind of thing to take up. It adds a new shade of appreciation to what a vintage claret ought to be. It stubbornly refuses to correct its idea of a Barbizon landscape by what it sees in a new Picasso. It takes little note after a time of new poetry or new religions. It is probably the special haunting ground of the intuitive faculty. Most certainly our intuitive powers exceed the capacity of our reasoning powers, chiefly because our intuition has command of far more memory cupboards. It can silently open a great many locks, of which our consciousness has lost the key.

In spite of the by no means negligible anticipations of double memory, which can be found in the past, the actual differentiation that I have outlined may seem fanciful and to offer at first sight little justification for further elaboration. Yet some generalization of the kind is scientifically necessary, because there is positive evidence that action-pattern memory really exists and further that it operates in a special way. The reserve memory, which stands behind the everyday memory with its happy-go-lucky slipshod ways, can be equally well described as the pattern-memory and it has different methods of operation according to the practical uses to which it is put. Its most important manifestation is in action-pattern memory, which perhaps can hardly be left unanalysed, in spite of its inherent difficulty. When all our material gained from introspection is still necessarily shadowy, it may seem a gratuitous mistake to go further and distinguish within the pattern-memory itself three kinds, if it were not that these three kinds function in three different ways.

In the first case action-pattern memory has a close resemblance to instinct. It seems possible that much action-pattern preservation is delegated away outside the brain. It has to work in intimate alliance with its instruments the limbs. It is probably equivalent to Ribot's motor-memory, which Bergson has essentially adopted. Within the brain it generates habit. How closely allied outside habit, part of which must be preserved in the limbs, as shown in keeping wicket, fly-fishing, shooting, playing musical instruments and so on up to arranging an exercise on a blackboard and solving certain problems in a definite way, can be to intellectual habit, where the whole process takes place in the brain, only those know who begin to draw the line between them. What is most definite and distinctive about action-pattern memory is the method that is available for replacement after injury, which will merit special attention later.

Sense-pattern memory may be sensually vague, as in standards of comfort, home-feeling, warmth, delicacy, expert habits in food and dress. It may be critically emotional, as in smell, which appeals to the cortex. It may be minutely definite, as in music and the knowledge of true pitch. It may play a vital part, as in visual perception. 'It would seem that, in man, all that makes up space-perception, including the correlation of sight and touch and so on, is entirely acquired. In that case,' says Bertrand Russell, 'there is a large mnemic element in all the common perceptions by means of which we handle common objects.' [1] Parsons, who has given precise attention to discriminating the stages of vision, writes of the epicritic stage of perception: [2] 'Awareness is focussed upon those features of the pattern which are of the greatest biological significance and becomes attention. The perceptual pattern fills the field of attention, but attention leads to the selection and segregation of the most important features in this pattern, so that part of it occupies the focus of attention and becomes a more highly discriminative pattern in which qualitative and quantitative details of the constituent sensations spring into consciousness. At higher levels within the *epicritic* stage,—but most of all within the *syncritic* stage, when biological significance has undergone sublimation—attention becomes interest.' [3]

It is evident that successive awareness, attention and interest import equally two significant but distinct processes within the sphere of memory. The first is the application in gradation of all existing memory patterns in ascending order of applicability to the incoming groups of sensations and the second is the creation and gradual fixing of a new composite figure, which will embody both a brand-new percept and also a modified stable perceptual pattern in the pattern-memory for future use.

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[1] *Analysis of Mind*, p. 81.

[2] The three stages are: (1) dyscritic, protopathic or elementary; (2) epicritic; and (3) syncritic, as here.

[3] *Introduction to Perception*, p. 44.

Idea-pattern memory is far more difficult to analyse. We know little about its formation or replacement since its instruments are the reason and intuition and do not borrow the use of hands and arms, hearing and vision. It would correspond to the Cartesian 'mémoire des choses intellectuelles'; it would be fairly represented by the Platonic doctrine of ideas; it would cover all those concepts which are familiarly known as 'universals', and include a great deal more. It must embrace vague spiritual and religious patterns and govern in science the attitude of receptivity to new ideas. It is evident that the further we get away from motor activities and sense impressions the less does the necessity and possibility for some kind of fundamental scheme such as we call pattern arise in memory. Something, however, is wanted and it might be useful to employ a different metaphor; perhaps the word 'frame' might be more consonant with the conception of a certain degree of consistency and continuity in the region of ideas.

The lines drawn between action-, sense-, and idea-pattern memories are not hard to grasp nor difficult to sustain. But to keep the pattern-memory as a whole, altogether apart from the table-drawer memory, is not always possible, either logically or in practice. The materials for plans, tunes and ideas slip in and out of one frame and into another, like thought and feeling. The patterns carried in reserve are always being extra-consciously improved by new details from the work-basket or rag-bag of miscellaneous recollections. Insignificant trifles of yesterday are faintly recalled and suddenly become the important items of to-day. The process is called 'revising our ideas'. The most common instances concern our opinions about people: 'And did she open his letters? I never thought she would do such a thing!'

I believe that, as with thoughts and feelings, emotional storms play the part of solvent within our memories, as they do in full states of consciousness. We are conscious to some extent of the results of extra-conscious emotional operations in memory processes. Not only do images of lost friends come back to us in emotional recall, but in art, whether musical, literary or representative, emotional appeal to past sensation is a great constructive force and is eminently at the service of our intuitional capacity.

Suppose that in our difficulty about the double memory we turn from introspection and look for support from the body to mind direction of argument, we shall find some, if slender, support for duality of memory in the method of replacement for losses in action-pattern memory. There is a region of memory half-way between motor-memory and idea-memory, viz. the field of aphasia in which Professor Bergson has adventured rather elaborately. Since I do not agree with all of his conclusions, I shall not follow his investigations in detail. I wish only to refer to one general fact, more or less admitted, that, when aphasia has occurred in patients through injury of the convolutions in one cerebral hemisphere, language has been gradually restored by comparatively easy methods of education. Many observers hold, by what I consider to be a very reasonable presumption, that gaps in one series of hemispheric records can be replaced from the uninjured stores of the other hemisphere.

As to parallel cases with animals there is now little doubt left ever since Sir David Ferrier's *Croonian Lectures* on *Cerebral Localization* in 1890. On the motor side he writes expressly: 'Besides the movements of the trunk, there are others which are also bilaterally represented in each hemisphere. This holds in respect to the upper facial region, as well as those of the larynx. Hence unilateral extirpation of the centres of these movements causes no, or scarcely any, perceptible impairment; and it is necessary that the centres should be destroyed in both sides in order that paralysis should result.' After adducing other authority and also researches by Professor Sherrington, he concludes: 'These facts, as well as clinical observations in man, show that, even in the case of the limbs, each hemisphere represents both sides of the body, mainly the opposite, but to some extent also the same side.'[1]

The doctrine of functional cross-compensation between the hemispheres holds good for motor results but does not entirely account for memory replacement. There is evidence from Goltz that the tongue, which is getting near to the memory, can be used with unilateral support. But the best evidence comes from patients who can be gradually re-educated after partial loss, a result which must arise from a dual supply in the records of each man's separate history. It is the specially individual character of each case which shows that there is very little room for chance occurrences in the rehabilitation of a man's intimate past from fragments that can be supplied by no one else. Professor Loeb reports two partial memory inhibitions from Würzburg,[1] of which one had forgotten all but odd numbers and only remembered those with progressive difficulty; the other could only name colours when he saw objects exhibiting them. Both these cases had fugitive memories, except an instinct for money matters.

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[1] *Lecture VI*, p. 133 and elsewhere.

Wherever, as in mental functions, there is nothing like dexterity or unilateral performance, there must reside in the two hemispheres a double area for memory traces in the marginal convolutions devoted to intellectual capacities. Brain is here acting on brain, the reserve part is linked up intimately with the executive part, and dual functions have only themselves to look after. There is thus no need for bilaterality and no process of crossing over is required from record on one side of the body to performance on the other. The paired cerebral hemispheres in their reasoning and contemplative areas may therefore very well carry dual instruments for double records, one in the nature of immediate records, the other in the shape of pattern or generalized records. Each area is free to communicate with indefinite rapidity with the other, as we already know to happen between cortex and thalamus.

The argument appears to be too thin to support much in the way of hypothesis, but it is correct as far as it goes. In the arthropods with their elementary system pure unilaterality prevails. The nerves on one side of the body affect that side of the body only. With vertebrates greater balance is secured by cross-innervation, right-side nerves controlling left-side limbs and vice versa. But there are connecting commissures.

In the brain of the higher vertebrates a subserving unilaterality supplements the predominant bilaterality, according to Ferrier, wherever there are two limbs performing similar functions. According to Sir Victor Horsley, in man the subserving unilaterality is partial, gradual and often indirect. 'It is not to be imagined, however, that this supplementary action is developed in higher animals as a constant feature, as their possible supplementation of function is only to be obtained by exercise after injury has befallen the organ.'[2]

[1] *Psychology*, pp. 281–5—reported from Rieger and Wolff.

[2] *Fullerian Lectures* (1891), p. 102.

Finally, in the case of a single limb, useful to the whole organism, like the tongue, unilaterality and bilaterality are combined in a certain sense. Either side of the brain is free to innervate motor action. It seems to me, then, that in the case of pure cerebration, largely independent of any crossed functions, the paired localities are free to act independently in support of each other, on a basis of a slight differentiation of duty. Dual memory organs may be detailed to act as first line and reserve respectively to each other, which would be in harmony with the known method, whereby any loss of capacity is supplemented after lesion and partial loss of memory.

Let us take as an example the two exactly balanced hands of a violinist; how deftly one learns to draw the bow, while the other presses the strings. We know that in simple things like throwing and using a knife one hand can slowly learn the habits of the other. In painting either hand can be used almost indifferently by some people. In all these cross-dexterous cases the really difficult part of the work is carried on by a joint function of two portions at least of the brain, a motor area and a rational area. Thus in using two hands we have two cerebral motor areas acting in co-ordination with two other cerebral non-motor areas.

It is not difficult to realize that two non-motor areas of the brain may exercise memory functions in organic co-ordination, by reciprocal co-operation instead of mere duplication, one area picking up fragments from life, the other fitting them into a puzzle map or harmonious and rhythmic order. On such a hypothesis each assists the other by selecting in more and more skilled fashion sensations likely to be useful. The first has to accept a promiscuous assortment from daily life, the second assimilates from the daily stock only the items which have closest relation to an already existent pattern present in the memory. Which of them is chiefly responsible for the important process of the forgetting selection we do not know; or does that process occur automatically from the joint neglect of both the agents of memory? It is probable that the business of forgetting and neglecting to preserve seems to be too intelligently done to be altogether a chance affair.

As for the hypothesis that the cerebral hemispheres, as a whole, execute motor functions, as a whole, and support the memory, as a whole, few people maintain it seriously. Flourens, the great French physiologist, triumphantly asserted the unity and uniformity of the brain against Gall in his day, but the steadily increasing definition of local functions in cerebral convolutions has narrowed the field in which anyone can possibly agree with him. So one more logical scientific observer has gone down in principle before the visionary whom he confuted, without anyone noticing that he has disappeared.

There is one certain gigantic fact appearing clearly from observation of others and from self-introspection. An enormous work of rejection is going on extra-consciously in every brain all the time. Some of it seems effected carelessly, but most of the work is subject to a rigorous selection by a very consummate intelligence, for which our conscious reason is not responsible. Am I far wrong in seeming to see two principles of memory, acting together in marvellous co-operation, each reciprocating the services of the other? If so, is not the intuitive faculty, acting extra-consciously, in charge of both assignment and selection?

Selection and assignment, perhaps I ought to say. The work of selection must precede assignment, because it includes the preliminary task, which begins in the primary perception of the senses, of rejecting a large amount of material by preference. The trained ear hears chiefly what it wishes to hear; the trained eye applies patterns and takes up surface colours and depth sensations to suit; the muscles do not note the even pressure of the body, while walking on the flat road, but only the added pressure of weight on an upward incline and the failure of pressure in a sudden declivity. After the preliminary selection of sensation, perception, and pattern-absorption comes the secondary selection of neglecting the irrelevant, forgetting the trivial and assigning the unsorted odds and ends to the work-table drawer, while the significant combinations pass into the moulding-room of the pattern-memory. Now it seems clear, that although the pathway of sensation-progress is very complicated, as we shall see in later chapters,[1] yet there is every probability that the work of selection and assignment for memory purposes takes place in or near the same locality, where science tells us that some and most probably all the results, as traces, are stored. The region is the grey matter of the convolutions of the twin cerebral hemispheres.

With the known situation of the process the problem of the identity of the operating intelligence presents itself as a simple alternative choice. When acting in consciousness, it must come under the description of the intellect or reason and, when the process takes place extra-consciously, it is known as the intuitive faculty. While a certain small amount of selection for memory is conscious, the greater part of it, and practically all of the forgetting, must be the work of intuition. There is no reason to surmise that either the reason or the intuition are in any sense divided between the two hemispheres or that they act separately, one in each. When the selection of material and its assignment are complete, there must be some degree of co-operation between the two forms of memory, but in saying that this process is perhaps part of the work of the intuitive faculty we do not throw much light on the method by which it is carried out.

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[1] Chapters XVII, XVIII and XIX.

There is a further stage to be considered. With or without internal co-operation of the two memories, the official recognizable memory is clearly under a form of control which does not reside in itself. We are sufficiently conscious that reason has not an effective control over the memory. There are also weighty arguments to be considered in respect of the phenomenon of oblivion, which incline us to believe that neither is the intuitive faculty in sole and complete mastery of the memory situation.

It seems to me that in memory we have an instructive case of instinctive relations with the intuitive faculty. The extra-conscious operation of the cortex, called intuition, is under the dominion in memory, as in other things, of the extra-conscious life-instinct of the whole organism, exercised, as from our argument in Part I we have reason to suppose is the case, predominantly in the thalamic region.

Perhaps I may be forgiven here if I make two digressions. In the first place, I must anticipate what I have to say later on the special powers of the thalamic region, which are due to its intimate relations with the stronger sensibilities, called protopathic or dyscritic, and occupied chiefly with primary biological needs. The instinctive intelligence seated in the thalamic region is urged by its close contact with elementary sensibility to exert a powerful influence on all life interests and particularly to secure effective preparation for immediate and concentrated action.

My second digression relates to the particular sense in which I use the word oblivion. It represents to me a state of uncertainty as to retention of mental facts in memory, which may or may not include partial or total loss. The real existence and content of memory traces is unknown to us. When part of any mnemic persistent is recalled, we do not know whether we are emptying its whole available content in consciousness or whether part remains behind still in partial consciousness. Oblivion does not mean total loss or complete irrecoverability. Oblivescence would mean the process of passing into such a condition of permanent suspense as oblivion.

Oblivion of the major part, vastly the major part, of the relics of our former consciousness is a prime necessity of health and efficiency. Our formidable past, formidable that is to say from the point of view of bulk and complexity, would remain a biological danger, unless it were kept in the background. At the same time to hold some of it within easy reach, if not at beck and call, is a matter of vital utility.

For neither of these purposes is the cortex itself to be trusted. There would be nothing to prevent it from working itself to exhaustion or extinction. Sleep may rest our limbs but it does not entirely rest the brain. It is not unreasonable to suppose that the indications are correct which point out to us that the guard over memory in the brain is not intuition but instinct.

It remains doubtful, however, whether the instinctive faculty is interested so much to secure life and health, as it is in insisting on the rapid and effective execution of what are deemed to be its own instinctive activities. The instinctive inhibitions, which are called down to arrest thought in the moment of action or to control the expression of emotion, when the latter might be a perilous alternative to energy, are launched even more effectively against the continual exposure of an irrelevant past. In dealing with an enemy, a danger or a prey, are we to be overwhelmed during the throes of violent effort by associated reminiscences of many similar situations? Of all the inhibitions oblivion is the greatest, the most comprehensive and the most necessary.

How is oblivion lifted? Apart from dreams, when dead characters generally act like live ones and the past appears as if it were present, I only know of three ways. It is very possible that there are more. They are ordinary association, casual presentation and release under interest, which is a kind of emotional stress. Association is the ordinary method in everyday use. It is the roundabout way used by the intellect to get rid of the instinctive obstruction imposed in opposition to the will. We pick up the threads of work and play by placing ourselves in appropriate situations, and reviving suitable conditions. We sit down at the piano. We take up a letter, newspaper or book. We interview a superior, a customer or a client. We reopen our interest in a new day by pulling up the blind in the morning. We take up the argument of a difficult subject by re-reading what we wrote yesterday. When more severely at a loss we trust to casual association.

Casual presentation is a rarer form of memory. It is uncultivated except by poets and artists, since most people distrust its temptations. Some thinkers deny that it ever takes place, calling it unconscious associative thinking. I am quite ready to believe it, but, since the associations are extra-conscious and without meaning, they do not greatly interest me. At present I am often aware of apparently unassociated visual presentations, generally of the same kind. It is never of a person, but always of a scene. It is usually recognized as a moment of rest in some past walk or climb or more often a bicycle ride. Without exception whenever any face, personage or group appear, I can recognize the train of thought that has brought them before me.

Release under emotional or a minor form of interest is the most significant psychological case, because it is an attack without any preliminary roundabout process or indirect association on the protective rampart of instinctive inhibition. Suddenly to lift the veil is not always easy. The application of the most obvious and ordinary method of opening the breach is not always or often as effective as a more roundabout attempt at approach.

Once I had a fortunate chance of time-testing two methods of this kind with a friend, whose mind I knew well. Sir Squire Sprigge, the editor of the *Lancet*, and I were talking to a common friend in the club about detective novels and we both together mentioned *The Cask*, but we neither of us could recall the name of the author, Crofts. I had time to seize on the case as a test. I knew that Sprigge was feeling for it in his mind in the ordinary way by some link of association. I noted the time, banished the whole scene from my mind and looked round the smoking-room, noticing four or five separate people and things. Like a flash the name came to me in fifty seconds, while my rival came on to it five seconds later before I had told him. My own capture was obtained extra-consciously and I had an opinion that consciously I might have been much longer in getting it. My own feelings were strained by interest in the test and not by any particular desire for the name. At present I usually employ the unconscious method in any similar case and very seldom fail to get a like result.

There is one group of memories which come upon all of us, asleep or awake, during middle life or later with great frequency. I call them myself, perhaps or probably wrongly, thalamic memories on account of their poignant emotional tendencies, positive or negative. They generally concern special affronts to me personally—not injuries, which do not trouble me—or else cases where I feel that I have injured others, thereby affronting my own sense of honour, justice or self-respect.

The thalamus itself can hardly retain any traces, in the technical memory sense, on account of the small quantity of its grey matter, but strictly speaking it is not impossible that it might be the seat of a separate memory, which would certainly be of an emotional or affective character. I regard it as more probable that the instinctive or thalamic activity should arouse from time to time a little corner of cortical recollections dedicated to self-esteem or inflated magnificence of imaginary character, thereby inflicting an unpleasant stab. They say that some animals and particularly elephants never forget nor forgive an affront.[1]

Admitting a scheme of duality in memory such as I have outlined, which is certainly not proved, it is or would be a purely local or functional duality, capable of a much higher degree of development than the reciprocal playing into one another of our two hands, but substantially of the same order. It could not be classed as a mental duality, although it might subserve the latter. It certainly does not correspond to the instinctive rivalry with the reason and intuition.

Cortical and thalamic duality are clearly shown above and outside of the group of double mnemic phenomena by the fact that the functioning of the higher brain in memory is controlled by some intelligence outside itself which acts most powerfully by imposing oblivion. The curtain of oblivion is heavier or denser during seasons of bad health and varies according to one's state of vitality from hour to hour during the day. With approaching old age the curtain is more easily lifted over some groups of mental phenomena, but becomes on the whole more permanently impenetrable over the greater mass of mnemic persistents. One special characteristic about oblivion, in that often it can best be removed by accidental, indirect, or ritual processes, exhibits a strong analogy to the various ways which reason has always employed in overcoming instinctive resistance, convincing instinctive obstinacy and dissolving instinctive obstruction. It is probable that memory is the very special field of activity of the intuitive faculty.

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[1] A friend has called my attention to a typical case of memory of injury by a camel, recorded by Palgrave in his *Travels in Arabia*. The animal vindictively savaged a native boy, who had maltreated it some time previously.

NOTE

A case of double memory of sufficient importance to be analysed here occurred quite recently in my own experience. It raises three points, two of which may be discussed under the heading of double memory; the third is more complicated, as it is a case of one intelligence checking another.

During the typing of this book by my own hands my attention began to wander. I had come to the end of the second sentence at the end of the word 'together'. My mind went with extra-conscious automatism to the idea of a full stop. The right hand sought the M key, which on the Underwood machine is second from the right in the third row at the bottom. The left hand with forefinger upraised reached for the lever which works the lifting-bar for numerals, stops, etc.

At that moment my conscious attention returned away from generalities back (1) to my text; (2) to my typing—I had not typed continuously for nine months; (3) to my right hand about to press the key for 'm', 'M' and 'period'. I forgot to think of (4) my left hand with third finger actually at the moment resting on the key for the lifting-bar. As a consequence my right was centrally innervated, but the left was not. The left lost its automatic and local innervation. My right pressed the key and printed the small 'm' instead of the full stop.

My attention then turned to the lifting-bar, where I found the left third finger waiting on the lifting stop, but not centrally innervated. If I had not consciously thought of my typing, no doubt *both* my right and left local innervations would have proceeded extra-consciously and typed the full stop correctly.

The points raised here are three: (1) Correct separate reflex memories acting automatically in co-operation without conscious attention. (2) Separation of distinct right and left hand memories by badly distributed central attention. (3) The checking power acting automatically, but in this case incorrectly, owing to interruption of extra-conscious automatic memory by conscious interference.

CHAPTER XIV

DUALITY BETWEEN CONSCIOUS AND UNCONSCIOUS SELVES

THE title of this chapter is a concession to popular terminology. The term, Conscious Self, is well-known, but Unconscious Self is an accident of definition. It was first made common by Hartmann, whose popular title, *The Philosophy of the Unconscious*, for his well-known book was said to be the suggestion of his publisher. In fact the comparative importance of the term in modern literature is a matter only of recent growth, of which new influence the most significant and most permanent result has certainly been to diminish the relative weight that used to be attached to consciousness.

We also admit that the dividing line between consciousness and its alternative states is not quite so firmly drawn as it was formerly held to be. There is a borderland. There are quiescences and sleepy activities, which are not easily definable. There is a more open attitude to some of the indeterminate points. The clear-cut opposition between consciousness and unconsciousness arose no doubt from the exaggeration of our natural belief in the intrinsic importance of our individual states. They are very important to each of us, but not all-important. It is now recognized that consciousness is not the sole criterion of the reality of our thoughts and feelings.

In a sense the subject-matter is old, but the special significations which have very recently been attached to several allied terms of the kind are new and not quite stable. M. Pierre Janet was responsible for the first definition of a much better word, 'the Subconscious', as he reminds us in a preface written to a work of Professor Jastrow. It is worth quoting in full, as indicating an important landmark in the history of the subject: 'Les études sur l'inconscient sont fort anciennes: ce sont des études de métaphysique sur la possibilité d'une intelligence différente de l'intelligence humaine, indépendante de la conscience et de ses conditions, telles que nous les constatons en nous-mêmes. Les recherches sur le subconscient sont au contraire beaucoup plus récentes. . . . Le mot *subconscient*, si on tient à la signification que je lui donnais quand j'en ai proposé l'usage en 1889, se borne à résumer les caractères singuliers que présentent à l'observateur certains troubles de la personalité.'

Nothing could be better said as a statement of fact, but it leaves something to be desired from the point of view of scientific descriptive terminology. Why so large a field of mental, mnemonic, psychical and psychological study should be thus surreptitiously segregated from other branches of the subject and labelled a trifle ostentatiously so as to attract the wrong kind of attention and to deter sober investigation, it would be difficult to say.

We can see now very clearly how quite determined the old thinkers were to look upon the human mind as a kind of clarified jelly, a little clouded now and then, but essentially homogeneous when in a sane condition. But are we going the right way about to arrest the uncertainties and deficiencies of the language in cutting up the field of mental phenomena into two dominions, tenanted by discontinuous populations of mental events and governed by discrete mental laws? Is it not advisable to get rid, so far as we can, of the element of mystery attached to all extra-conscious forms of mental reality?

The first stage of the study of subconsciousness became more and more murky, until it was found that a little mysticism might safely be added in order to popularize the subject. The term subconscious was dropped, as being narrow and on the whole too definite. 'The Unconscious' was adopted, as a more comprehensive and portentous characterization of what was rapidly becoming a kind of 'viscero-mental' cult with its own system of bogies and superstitions. As Dr. Watson rather wittily wrote on behalf of the 'Behaviourist School': 'The Freudians have made more or less of a metaphysical entity out of the "Censor".'[1]

Let us turn again to M. Pierre Janet for a moderate version of the change that was brought about: 'Depuis l'époque ou j'employais ce mot de *subconscient* dans ce sens purement clinique et un peu terre à terre, j'en conviens, d'autres auteurs ont employé le même mot dans un sens infiniment plus relevé. On a désigné par ce mot des activités merveilleuses qui existent, paraît-il, au dedans de nous-mêmes sans que nous soupçonnions leur existence; on s'est servi pour expliquer des enthousiasmes subits et des divinations de génie.'

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[1] *Scientific Monthly*, Nov., 1916.—The Censor is, of course, the full weight of group opinion, arising from personal instinctive sources and communicating itself from one instinct to another without giving more than casual notice of its existence to any individual consciousness.

A sympathetic and yet moderate view of the doctrines of the new school is represented by Dr. Wittels in the glossary to his *Life of Dr. Freud.* There two meanings are given to the expression 'The Unconscious': (1) all mental processes which are not in consciousness at a given moment; and (2) more specifically, those mental processes which cannot be brought into activity by effort of will or act of memory. The latter definition covers the important generalization which the author calls the typical psycho-analytical sense. It represents a group of ideas whose disclosure and isolation have proved of essential value in a special department of therapeutics, a branch of pathology studied with great closeness owing to its frequency immediately after the European War.

From the scientific point of view the whole subject suffered a grotesque exaggeration from its sudden rise into prominence. It has not yet completely recovered. Part of the trouble and a great deal of it arose from the mere addition of the definite article to the abstract term, Unconscious. 'The Unconscious Self' became personified; he was accompanied by a 'Censor'; he began to have habits and a character; a literature and finally a mythology began to surround him and endow him with a formidable separate personality, distinct from that of the 'Conscious Self'.

From Dr. Wittels's short history of the new movement, now hardly twenty years old, we learn that a schism began early to appear. The founder of the therapeutic method, which largely depended on dream interpretation, Dr. Freud, a distinguished original thinker, was opposed in his general scientific interpretation of unconscious phenomena, by two men also of considerable power, Drs. Jung and Adler, on different issues. Dr. Freud preferred to adhere closely to the medical aspect of psycho-analysis, concentrating on problems of repressed desires and inventing a special fantastic technique for their elucidation. Dr. Jung emphasized the single source of these phenomena and maintained that life problems in general were substantially equivalent to problems of continuance of the species. Dr. Adler, on the other hand, held the view that the chief spring of all action, desire and inner activity lay in the tendency to self-assertion. The writings of all three men show a high level of scientific insight and originality and are well worthy of close study.[1]

I have no opinion on the relative merits of their dispute on the medical side, but psychologically Dr. Adler's general view seems to me to include all the phenomena especially stressed by the others and to account for a good deal which would otherwise lie outside their theories. Both the ordinary history of individual lives in consciousness and the observed evidence of their unconscious or extra-conscious desires, as analysed especially in dreams, which I will consider later, convince me that all mental phenomena lead up to a universal end or purpose, which consists in establishing the subject's personal validity. Individual variations prompt three different orientations for our primary personal will. They can be arranged in any order of preference, which each psychologist may select. Accomplishment of an ideal purpose; personal superiority over others; and continuance of the race are different forms of the same fundamental tendency. The last is naturally propagated in the race without remission, while the two former aspects have a tendency to crop up occasionally in extreme forms and to die out.

One consideration of language presents itself at this point, which will facilitate discussion. Let us drop the definite article and all attempts at personification of unconsciousness, until we are sure that they can be justified. We have unfortunately lost the term, 'subconscious', owing to medical criticism and the authority of Dr. Rivers. I see no special sanctity in 'unconscious', when used as an adjective. I prefer the term, 'extra-conscious', as being wholly free from special meanings and reviving a reasonable and useful spatial metaphor. 'Subconscious' was perhaps too narrow, as implying a threshold with several floors below it. 'Unconscious' is far too wide and admits all inorganic nature. 'Extra-conscious' pictures consciousness, as a sphere, with mental phenomena slipping in and out of the concentric circles of our awareness in different planes. It does not presuppose our consciousness fixed in a particular plane.

One or two French authors have written on this wide subject with great weight. I have especial sympathy with M. Ribot's emphatic protest against the term and idea of the 'Unconscious Self', which, as he says, implies the existence of a co-ordination among unconscious impulses, which is wholly absent.[1] Professor Bazaillas has also given a good working description of our extra-conscious existence, as 'la vie des tendances, saisies à leur moment de l'origine'. He regards the study of the 'unconscious self' as provisional and tentative until answers have been given to the following questions: How can we have ideas without consciousness? What kind of a 'representation' is that which escapes all verification? Is there a separate centre of activity, which can be assigned to the unconscious? What is its nature? How can one penetrate into its system? [2]

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[1] Dr. Freud's works are well-known and are most of them translated. His best work, giving his philosophic views, is *Beyond the Pleasure Principle*. Dr. Jung's *Psychological Types* has been often referred to in the present work. Dr. Adler's able treatise, *Individual Psychology*, has also been translated, but too many technical terms and expressions are left obscure.

The questions presented by Bazaillas represent a criticism unmistakably valid on the body of literature, which has covered so much 'unconscious' ground and detailed so many 'unconscious' phenomena, while telling us so little of their origin, that I feel almost tempted to stop and reply to them specifically. The first two, however, are questions from the old philosophical standpoint addressed to the new, which are hardly within my province. As to the other three, I shall leave them to be answered indirectly in the present work and particularly in the present chapter.

Perhaps we ought to begin at another and more practical angle by asking in what overt forms do our extra-conscious activities appear? Can they be summed up in a few headings, including the subordinate but indispensable physical operations of digestion and so on, which are intelligently conducted with no reference to the central mental authority or with only occasional appeals for help? I think they may be roughly grouped under seven heads, each progressively coming nearer and nearer to the character of avowed mental events. The first three or four are predominantly appertaining to the body; the later three are quite clearly mental in character in various degrees.

Although there is a physiological explanation of the process, the most mysterious of our extra-conscious performances is, next to memory, our method of entering and leaving sleep. If it were entirely unconscious, it would be less difficult to comprehend, but our apparent half-control of the conditions is very perplexing. We can often induce or defer sleep by will and concentration and we can train ourselves to wake early regularly or on specific occasions. But once in the dormant condition, there is complete surrender of will and partial loss of consciousness.

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[1] *La Vie Inconsciente*, p. 66.

[2] *La Musique et l'Inconscient*, p. 171

Almost unconscious are the private functions of the trunk and viscera, chiefly represented by the co-operation between the peripheral or so-called sympathetic system of spinal nerves, balanced by the autonomic system under the disposition of the vagus or tenth cranial nerve, where the lungs, heart and bowels are kept going quietly night and day by judicious stimulation and inhibition, making no fuss unless there be an approach of organic danger. Behind these carefully balanced systems lies the mysterious apparatus of hormone secretion by the ductless glands, which, while wholly unconscious, seems at times to come under emotional suggestion and instinctive control.

Next come the reflex actions, where our defensive habits are regulated by minor well-trained, semi-intelligent centres. These, as we know, link up with the instinctive activities, which have been already elaborately studied. Following them in order and emerging into conscious operation at a late stage in a similar way to the instincts, is the activity of the intuitive faculty. Finally we come to the vast machinery of memory, with mnemic events slipping in and out of consciousness.

The clearest element of extra-conscious activities is memory and memory also holds the largest amount of mental facts in reserve outside consciousness. Our somatic machinery grinds on without any mental record of its work; it is work which is done unconsciously, both in the present and as far as the past is concerned. But we do not, as a rule, remember anything but conscious mental situations. Owing to the fact that we have no memory, or none that we can recognize, of anything, which has not first appeared in consciousness, the latter condition must be regarded as conspicuously a mental affair.

A governing circumstance of the greatest and most comprehensive significance is that the activities of consciousness do not present any bold line or distinct demarcation, denoting the passage of extra-conscious into conscious activities, other, that is to say, than the fact of such passage itself. The passage out of consciousness is quite unmarked as a conscious fact. After fainting there is no record whether there was or was not immediately previous sensation or suffering; memory being no certain clue, since memory itself may have been effaced. The passage into consciousness is increasingly conscious, but the stages are elusive.

The difference between sleeping and waking is no doubt the most sharply drawn. All physical activities go on under one condition as under the other. Reflex, instinctive and intuitive activities are mostly extra-conscious, but all pass at certain stages into consciousness. The logic of observed facts is against any opposition or duality between a supposed 'unconscious self' and our recognized conscious self.

The same view is taken by most authorities who are not already committed to the doctrine of a personified 'unconscious self'. Dr. McCurdy is perhaps the most definite in maintaining a continuous passage of mental phenomena from unconscious into conscious stages. He writes: 'In order to explain emotions I have fabricated a hypothesis of unconscious mental processes which, in continuous operation, not merely parallel consciousness but actually support and nourish it. These unconscious processes issue in behaviour, voluntary and involuntary, in emotions, and in conscious thinking. If this be sound thinking, it must be possible to explain all psychological phenomena in these terms. . . . Something that extends down to the physiological level cannot be accurately labelled in a terminology derived from conscious mental experience. It is, however, applicable to the major portion of the phenomena discussed. Eventually it will have to be abandoned and its place taken by some word which can be used indifferently in the description of conscious, unconscious and neurological events.' [1]

A few pages later he continues in the same strain. 'Physiological functions are developed into mental ones, and how do these culminate in consciousness? There is no answer that is as yet even promising.' [1]

In looking elsewhere for a solution of the same problem we find Sir John Parsons illuminating and comprehensive, but not quite so convinced as to the underlying unity of mental phenomena. He sees them passing in and through consciousness, but not necessarily identical in character with each other during all their stages. He lays stress on a co-ordinated onrush of impulses in a single 'complex experiential pattern, which, cognitively regarded, has meaning'. Though changing constantly it preserves consistency throughout all its mutations. 'This continually changing pattern is the stream of consciousness. Though complex it is unitary and is the individual's self. Viewed from the vantage-point of man's consciousness, it is continuous even though it is always in part potential and sometimes appears to be wholly potential. This potential consciousness is the so-called unconscious.'[1]

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[1] *Psychology of Emotion*, pp. 572 and 574.

Among the mental contents which are mostly below the threshold, so to speak, or outside the realm of consciousness, Sir John enumerates the unconscious in time and in space, instinctive activity and acquired habit, implicit ideas and ideas suppressed by conflict in the Freudian sense. Allowing for some uncertainty as to the effect on the mass of mental phenomena of the reality instead of the potentiality of consciousness, it is difficult to find a more complete picture of a comprehensive and larger whole on which the light of consciousness shines from time to time between rounded sleeps like the circular patch from a dark lantern.

The philosophers of modern thought hold the same language. Professor Blondel writes of the 'causes profondes et pour ainsi dire souterraines, comme des germes inconscientes de la conscience'.[2] Mr. Bertrand Russell writes in much the same strain as Sir John Parsons: 'There is, so far as I can see, no class of mental or other occurrences of which we are always conscious whenever they happen.'[3]

Putting together side by side passages from authors differing sufficiently in their point of view, we see that philosophical speculation has little difficulty in keeping step with scientific observation. Provided that neither one nor the other be tempted to dwell upon the differences between conscious and extra-conscious mental states nor to be dogmatic in declaring that any mental state must be one of the two, it is clear that both are essentially interested in the same broad issue: to discover a central unity, which is more important than all the separate mental phenomena, whether conscious or unconscious.

The tendency, in fact, lies in the other direction of so insisting on the homogeneous continuity of mental processes through all extra-conscious and conscious stages as to minimize the importance of the latter altogether, which is the phase into which the late William James was passing towards the end of his life. Mr. Bertrand Russell, for instance, finds himself unable to agree with Sir Henry Head that 'sensation, in the strict sense of the term, demands the existence of consciousness'. His view is that sensation is not an instance of consciousness, 'though the immediate memory by which it is apt to be succeeded is so'.

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[1] *Perception*, pp. 36–7.

[2] *L'Action*, p. 103.

[3] *Analysis of Mind*, p. 288.

At this stage of the argument consciousness appears to be becoming so tenuous that perhaps it is necessary to rescue it from disappearing altogether out of the psychological field. I agree with Sir Henry Head's view that consciousness cannot be separated from sensation. Sooner or later one implies the other. Sensation at some stage of its progress emerges into consciousness and is enhanced by it, even though all the stages of the process of sensation are not within the conscious circle. It would not be reasonable to talk of a mind which consisted of nothing or contained nothing but unconscious sensations. Any logical observer, confronting such a phenomenon and being aware of all its conditions, would begin by giving it another name than mind before comparing it with mental machinery working in consciousness.

It is probably not true to say that consciousness must be necessarily conscious *of* something. Sooner or later, and generally sooner, consciousness will certainly become aware of something, after it has gone through the process of expanding into a fully endowed capacity. It may clearly exist before it has an opportunity of exerting its capabilities, just as a man may be strong, even while lying in bed. Thus we come to the solid conclusion that consciousness must be a personal condition or capacity within whose range and influence certain bodily and mental phenomena pass in the ordinary course of their development without undergoing beforehand any great or preparatory change. From this point of view we may now attempt to define it.

Consciousness is a ready and immediate bodily capacity for entertaining and facilitating [1] the operation of the higher mental phenomena. During this special condition of bodily preparedness mental phenomena in the form of more or less confused sensations are freely received within the play of the thalamic, mid-brain and cerebral organs, as well as throughout the nervous system. The resultant complex compound sensations are free to float, combine, modify themselves or be modified and recombine within a circle of potential physical apprehension and later of comprehension. They pass by degrees into grades of more complete and defined perception and cognition in the special manner enjoyed by each bodily system, i.e. by each individual personality.

The power and efficiency of the intelligent centres and especially of the cerebral hemispheres, are thus given greater opportunity of development and these organs thereby obtain a certain independence in choice and the right of rejection of material. But they seem to have very little capacity for initiative in calling for an additional supply of sensation on their own account, except through the whole organism and by means of the motor system.

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[1] For justification of the word facilitate, see note at end of chapter.

Consciousness is a bodily and not a mental capacity. Consciousness is not a consciousness of something. Consciousness exhibits its influence in successive degrees of awareness of mental operations, which are already in full working order and very often actually progressing in a condition of relatively inferior efficiency. Consciousness is reckoned to be a mental unity in spite of the diversity of the material coming within its influence. This assumption may possibly be correct. It is possibly also only a provisional unity during our waking life.

While consciousness gives the opportunity for increased validity and effectiveness to mental phenomena, it also affords material for the retentive powers of memory, of which it appears to be the special and unique condition. So far as we know, we do not remember anything outside consciousness. The sublime fancy that 'our birth is but a sleep and a forgetting' has little psychological foundation and there is no tangible evidence that 'trailing clouds of glory do we come'.

The hypothesis, which has proved a useful one in medicine, that ideas in consciousness may be permanently in conflict with opposite ideas founded on desires in unconscious neural conditions, so that the latter are repressed and for the time suppressed, is probably only a partial statement of any given condition of facts. Any conflict of ideas in consciousness is probably paralleled by a similar conflict of extra-conscious and unacknowledged propulsions, the former being a reflection of the latter. The hypothesis that is not tenable is that there is any stable ranging of unconscious forces against a conscious system of ideas.

The growing weight of evidence lies in the other direction. Mental processes of all kinds, from very elementary ones, which accompany important physical operations and activities, to advanced logical speculations more or less hung in the air seem to follow their own laws, which are by no means dependent on consciousness. Memory is the one fundamental capacity which seems dependent for new acquisitions from the beginning on fully conscious mental operations, but all its reserves are held in extra-conscious suspension in conjunction with 'traces', the exact nature and functioning of which we do not understand.

Reason acts in consciousness and governs all conscious mentality, but it rather enhances the validity of these operations than confers on them any special character or opportunity of existence. Mental events inside consciousness are co-ordinated by the power of reason within limits. Similar mental events taking place outside consciousness are co-ordinated by intuition with far less facility and the results are left in cloud or altogether out of reach. They do not appear to be able to exert will nor control motor forces. To a minor extent unconscious mentality may disturb the action of reason, as by the impulses of instinct, but even these disorders can be understood and counteracted.

It is a mistake to speak of the 'Unconscious Self'. There is no entity to which that term can be applied. Consequently any hypothesis of a duality between conscious and unconscious selves falls to the ground. There is no reason to suppose that all the operations of the thalamic region or that all instinctive activities are extra-conscious, nor, on the other hand, that all cortical mental operations take place in full consciousness. Neither one proposition nor the other is true.

The doctrine of the existence of an unconscious self has become fashionable owing to the writings of the very able group of medical men who have developed the theory and practice of psychoanalysis. It was a generalization never expressly formulated and rather grew up, instinctively, so to speak, by inference from clinical practice, owing to its usefulness for an immediate purpose. Although it covered to a considerable degree the activities of the instinctive faculty, I venture to think the symbolic idea was mistaken [1] and really amounts to a misdescription of something very similar, but not identical with it. The activities usually associated with the 'Unconscious Self' are really hidden instinctive activities, developed in extra-consciousness and not revealing themselves, until they are close to the point of open action. They are not entirely unconscious or extra-conscious, even in their pure and almost animal operation.

Advanced instincts, on the other hand, come more and more into the open, as parental instincts, dominating tendencies and impetuous rivalries. For that very comprehensive reason instinctive activities cannot be ranked as prevailing solely among the subterranean human forces. However much they may exert unavowed influence on conduct on specific occasions, they cannot be appropriated among the private and hidden energies of an unconscious self. It is only metaphorically that the term, self, can be applied to any reunion of unconscious active potentialities.

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[1] I certainly shared the mistake myself and used the term 'unconscious self' in denoting the actions of the ordinary self acting under the influence of its instinctive impulses. See my *Psychological Theory of Value*, Chapter VIII.

Equally forcible are the arguments why the life of intellect should not be considered as constituting the sole conscious self. The life of reason is interrupted and coloured on one side by instinctive and emotional forces, which are largely extra-conscious in their origin, and is stimulated and encouraged on the other side by our intuitive inspiration and logic, which are unquestionably cortical in their operation and without doubt almost entirely extra-conscious. Yet both these faculties on the fringe of their operations do actually come into consciousness. If we were to set up instinct and intuition as exactly opposite faculties, which they are not, it would probably be true to say that the practical operation of instinct appears more forcibly and authoritatively in consciousness than the quieter and more recondite promptings of intuition.

The decisive argument, which has decided me to give up the useful personification of an unconscious self, is in fact the physiological one, a point on which I shall dwell later. What constitutes the self is action. Now the unconscious or extra-conscious mental processes are not co-ordinated in the direction of action. Neither singly nor together have they any access to or control of the motor system. In consequence they cannot earn nor deserve the name of self. They influence desires and supply motives, but they cannot act.

The phenomena of suggestion and hypnotism lend some colour to the personification of a supposititious self. Other selves, such as Léonie I or Léonie II, can be constituted by hypnotic influence, so as to act independently of Léonie herself. Their possibility did constitute for some time an argument that there could be several selves in one body. But I think that these so-called selves are so obviously conditional on an outside will, so temporary and evasive, that they must be analysed away. If they are 'selves' at all, it remains a question whether they would not be minor selves of Charcot or of Morton Prince or of whoever the influential operator might be. It is arguable that they belong to the will employing them and not to the body, which was acting as the instrument. It is better to put aside the term, self, altogether, as being no more than a picturesque metaphor. So away go the 'subliminal self' and the 'subconscious self' together with the 'unconscious self'; only 'extra-conscious mental events' remain, whose influence on action is indirect.

It must be admitted that the duality or the supposed duality of conscious and unconscious selves comes nearer to denoting the divided influences exerted on our lives by the thalamic and cortical regions of the brain than any other duality. We can see how a certain antagonism between instinctive and intellectual activities suggested the idea of a full-fledged secret self operating to defeat the avowed intentions of the above-board moral and intellectual self. Similarly the conspicuous contrast between certain stages of feeling and thought would help to build up the dual personification of selves. The hidden self would have stronger feelings and deeper emotions, while the upper self would tend to be cool, calculating, interested and intellectually arrogant.

Would it not be better to put the problem, as it were, in the exactly opposite way from the ordinary dramatic contrasts, which we have examined under the guise of dualities? Will it not be better to wait for the unravelling of these paradoxes, until we are acquainted with their hidden origin? Given a double seat of mental operations and a double source of intelligence, is it not easy to understand how the sensational idea of double selves has arisen, how the light-hearted among mankind have chased pleasure and the serious have shunned pain, how poets have pictured the warfare between head and heart, how thought has been matched against feeling and intellect against emotion? Even the dualisms of light and darkness, mind and matter, right and wrong have drawn much of their brilliant contrasts from the double fountain of energies within ourselves.

NOTE

I prefer the word, facilitate, here in the definition of consciousness as compared with 'enhance'. Perhaps the latter word implies some sort of active principle. While it would be a mistake to limit ourselves to the statement of Huxley (*Animal Automatism*, 1874) that 'Consciousness would appear to be related to the mechanism of the body simply as a collateral product of its working . . . without any power of modifying its working', it is unnecessary to posit consciousness anywhere as an agent. It is not an agent in the same sense as we presume intelligence to be a form of agency. Consciousness undoubtedly facilitates the operation of reason in some way as compared with the obscurer operation of the extra-conscious instinctive faculty.

It is necessary for us to realize the minuteness of the field of consciousness, compared with the totality of present mental events, before we can have any notion of the magnitude of the changes which occur within the sphere where consciousness is effective. It will then be less necessary to dwell on the evolutionary explanation of consciousness, as elaborately confirmed by Bradley, James, Pringle-Pattison and Ward, in order to understand that its extreme utility must be the factor which has placed it high up where it is among the human capacities.

It may be asked, further, what happens in consciousness which does not happen outside it and yet comes within the purview of a given personality? Three important things happen:

(1) A stable form of unity is effected between the instinctive faculty on one side and the intellect with the intuitive faculty on the other, which facilitates action.

(2) The operation of the cerebral hemispheres is facilitated, as compared with the latent powers of the thalamic centre, which temporarily retire into the background.

(3) The accentuation of certain mental events, which is facilitated in consciousness, enables them to be perpetuated in memory.

CHAPTER XV

DUALITY IN EXTRA-CONSCIOUS EXPERIENCES—DREAMS

The prolonged disturbances which occurred in Europe just 100 years after the Napoleonic wars brought about a strangely excited condition of mind, which was common to many countries. War experiences had some similar psychological results everywhere, both in countries which suffered defeat and privation and others where a turbulent social condition followed victory. The innate duality in human nature came out very strongly and its study took the form of a medical analysis of pathological psychology, which carried popular opinion before it everywhere. It was led by the group of original and able men whose writings were briefly discussed in the last chapter. Their views, however, were never triumphant in scientific and philosophic circles and their influence on European thought is already on the wane.

The rapid generalization, which they made fashionable, was a duality between the unconscious self and the ordinary everyday personality. Now there is a real duality within us, not very apparent, in the rivalry between instinct on the one side and reason with the intuitive faculty on the other. If this remained to be established by introspection, in all probability the world would not be inclined to accept it as final any more now than during the last 500 years. The new circumstance, which gives it the force of conviction, lies in the physiological evidence recently made available to support it. No doubt it will be speedily reinforced by fresh investigations in the anatomy, physiology and observed behaviour of the brain organs themselves.

The new evidence gives a sure foundation for the instinctive and intuitive faculties. It establishes a duality which cuts right across the distinction, a very real one, between our conscious and extra-conscious experiences. The duality shows itself in both sets of experiences and to some extent in the neutral ground between them.

If we assume, as I shall presently do, that the neutral territory of mixed states, where conscious and unconscious experiences overlap one another, is mainly ground for medical study and has received and is receiving already an ample share of expert attention, the remaining field for investigation in the nature of human duality is divided quite naturally into two halves. How far do the rival tendencies in human nature, which are really wider than the scope of instinctive and intuitive contrasts and might better be called thalamic and cortical poles respectively, show themselves in extra-conscious human verifiable experience? Moreover, what clear evidence have we got in consciousness that the mind is really dual in nature, capable of and prone to self-criticism and continually subject to the pull of double motives before action? These are our two specified problems.

Apart from physiological features of duality, where future research may yield rich results, it must be confessed that the amount of material, both within consciousness and outside it, available to satisfy these queries is not very large. If much weight is to be attached to the answers, very close study of all the evidence is specially necessary. It seems to me therefore to be a wise plan to plot out with unusual care the lines on which the present enquiry will be conducted.

In the present chapter I will first of all sum up what results seem to me to be established and what suggested about the nature of our dual selves, based on the introspective examination of instinct and intuition already undertaken in Part I. I shall then proceed to enquire if there is any further evidence of duality to be found in our extra-conscious experiences and in our mixed states. The latter mostly consist of pathological conditions, insanity, intoxications, hypnotic states, complexes and suppressed activities, about which there is a considerable amount of expert literature. Beside these there remains a small pocket of knowledge about dreams, a special case which I shall discuss as coming within the range of normal phenomena.

In the next chapter I shall run over the considerable amount of small detail, which seems to me to show clear evidence of duality in consciousness. The material is ample if thin, but valuable as far as it goes. Much more difficult and perhaps even profound are the questions arising on the instinctive control over emotion, the intuitive influence on mind and the grounds we have for believing that we have or can have self-knowledge. It seems to me quite possible that the ordinary assumptions as to the necessary unity of the mind are in some danger of being shaken and that the presumption of duality arising from our new physiological discoveries in the thalamic region has a stronger *prima facie* case than is generally supposed. Since most of us are apt to believe, as if it were a matter of self-evidence, that we have unity of mind, I am inclined to be glad that, although there are real difficulties in believing in it, we are justified in being confident that unity of the human mind is a possible, real and an almost established fact.

In the succeeding three chapters I propose to reconsider at greater length all the available physiological evidence for the duality of our mental machinery and to examine in detail the thalamo-cortical equipment very briefly sketched at the end of Part I. Finally, in my XXth Chapter, which will terminate Part II, I shall resume the effects of the physiological discussion on the question of mental duality as a whole and not in relation to instinct and intuition only.

For the present I have got no farther than realizing a very definite mental opposition, one based not on feeling at all, nor on any presumed opposition between thought and feeling, between two forms of intelligence physically situated in the thalamic and cerebral regions of the brain respectively. The first form of intelligence is called the instinctive faculty and it operates both within and without our usual conscious states. The second form of intelligence operates also within and without consciousness, but it is universally recognized under two forms. When operating consciously we call it intellect and we acknowledge its superior dominion over the greater part of our life under the name of the reign of reason. When operating unconsciously, the activity of the cerebral hemispheres is generally known as intuition and is credited to the intuitive faculty. For the special reason that the intuitive faculty has a peculiar control over the stores of memory, which the conscious intellect cannot claim to possess, it is well to believe that the intuitive faculty has powers rather beyond our comprehension and deserving a special rank of independence. There are thus three faculties: the instinctive faculty acting in and out of consciousness; the reasoning faculty acting solely in consciousness; and the intuitive faculty, substantially operating outside our control and outside consciousness.

The duality, the mental duality so often here referred to, is that of the instinctive faculty based on the thalamic region on the one side and the twin faculties of intellect and intuition based on the cerebral hemispheres on the other. Both opposite intelligent forces are capable of feeling as well as thought, although in very different degrees for physiological reasons. In each the interplay of thought and feeling is independent and results in conscious and extra-conscious tendencies of character. Both therefore come very near to being detached and rival selves, except for their common dependence on the motor system.

The supreme authority in consciousness lies in the reasoning intellect. It controls the motor system for all conscious acts, which in our lives happen to be by far the most important elements of our existence. On each side of reason lies an almost independent power. The more energetic ally is the instinctive faculty, working within and without consciousness, interrupting and interfering with the free play of reason itself. The far less powerful, but more intimate ally of reason is the intuitive faculty, operating only in extra-consciousness. Both exercise influence and exert a pull on the central control. As I decline as yet to refer to them as separate selves, I prefer to call them groups of tendencies. They are tendencies exerted on the central self by the instinctive and intuitive faculties.

We can legitimately acknowledge that these contrasted groups of tendencies have each a special character, which will repay examination. Instinctive tendencies are, of course, not the same as instinctive activities, which begin and develop extra-consciously, realizing themselves suddenly in action. The former originate extra-consciously and appear gradually in consciousness, becoming under intellectual guidance advanced instincts or permanent motives, influencing the general policy of the self. Intuitive tendencies are the allies of reason, working to carry out policies preferred by the intellect, but resisted by instinctive tendencies. There are thus within us an instinctive character and a reasonable character, reinforced by intuition; two separate dispositions, which often work in opposite directions.

Let us examine the general nature of the instinctive character. It is prompted by a form of intelligence far inferior to that of the intellect. It is usually charged with feeling and often coloured by the emotions, because physically the seat of the instinctive faculty in the thalamic region is near to, if not identical with, the source of the emotions. It is powerful with the rugged virtues of animals, but it is not necessarily animal in passion in any evil sense. In women, for example, where instinct is stronger than with men, the instincts are predominantly moral. One of its most important qualities is sympathy, the power of communicating extra-consciously to other instincts a high emotional tone, acquired by the control which instinct possesses over emotional expression. All controlled emotion passes into inner energies and becomes a social force of great importance in moulding group values, collective character, group enthusiasm and public opinion.

The intuitive character must be regarded as a superior form of the intellectual character. It works in concert with the latter, heightening its powers, inspiring it with abstract ideas, cleansing and refining its share in the emotions, sublimating its passions and lifting all private interests on levels of ideal good. Reason and intuition together control all the patent modes of expression from man to man, tradition, language, art, literature and the higher branches of learning and science. In this region of thought their power is so supreme as to conceal an element of weakness. The intellectual and intuitional side of character does not possess that power of emotional appeal which can stir the instinctive sympathies and energies of others. The only direction in which the twin intellectual powers can compete with instinct in forming corporate opinion is in the monopoly they possess of discriminating between the merits of abstract theories, of determining scientific formulas, of controlling news, views and the details of government, business and material development. The contrast between these rival powers of man in their capacity for organizing society and constituting group units is very marked.

There is no doubt a great temptation to personify these two types or characters and to call them Instinctive and Intuitive Selves, even at the risk of neglecting the obvious share of the Intellect. In fact to a certain extent this has been already done in an imperfect way by recent schools of thought.

The notable group of psycho-analysts have virtually personified the Instinctive Self in their grim realization, 'the Unconscious'. This phantom breaks up fatally under criticism, when we note that much of the work of the unconscious self is done disagreeably and painfully in the open, while on the other hand much mental energy is extra-consciously expended in directions which are obviously within the province of intuition, as Dr. Jung especially would acknowledge.

Equally remarkable is the personification of the Intuitive Self by Professor Bergson and his numerous followers. If I read aright the wonderful rhetoric of *Matière et Mémoire*, all the better part of memory is firmly in his grasp; and according to *Données Immé-*

diates de la Conscience intuition holds the key to eternity by makin
us understand the superiority of duration (*durée*) over the trivi
efflux of time. The use of lofty metaphors is so nearly justified that I should be tempted to bow to a great example, if I did not remember that our intuitive faculty is tied to the use of a body and to definite organs of it, about which we are beginning to know a great deal.

A little latitude in personification is a great aid to language and to the imagination. If I were to appeal to it for assistance, I should feel obliged, however, to follow a more pedestrian path. The only kind of physical centre that can be found for the instinctive faculty is a little mass of grey matter in the medial nucleus of the optic thalamus, while the intellectual and intuitive faculties are obviously grouped in the cortex of the cerebral hemispheres. Both these centres are real centres, where feelings and thoughts of a kind arise, impulses originate and are perhaps judged and whence resolutions flow, as we know with almost as much certainty as we are aware of the mechanism of the sensations of sight, hearing, taste and smell. How, then, can we call these presumed selves anything but thalamic and cortical selves, or similar terms which would tie up these great capacities to their real localities of power and origin? Must we not, however, be reasonably afraid that the reading and thinking public are hardly prepared as yet to accept representations and dramatizations which would too vividly recall the corporal side of our higher faculties or to consent to find their minds and perhaps their souls placed with too easy an assurance in rather humble dwellings?

It is safer for the present to avoid emphasizing or exaggerating any of the elements of duality until all the phenomena have been studied more closely. Where are we to look for evidence of duality in unconsciousness or extra-consciousness? It is an exceedingly difficult question to answer. There are the observed phenomena of instinct and intuition, but they have been already found to be mostly of a double kind, partly within and partly without consciousness. There remains only one direction where we may look for new extra-conscious material and that lies in dreams. Although it is debatable whether the relevance of this kind of material is admissible, I think on the whole that it is, just for the opposite reasons that I cannot consider that hypnotic experiments furnish independent material free from outside influence.

Dreams might be called mixed states, partly conscious and partly outside ourselves. Another description might, however, be nearer the mark. They are states of bare awareness, subject to no criticism, evolved directly from extra-conscious sources and unadulterated by any serious contribution from actual life. Above all they are unchanged by active thinking. They are therefore strictly unconscious material of a particular character and almost the only independent introspective mnemic mass of the kind that we have. They are beyond external observation. We are not directly aware of the dreams of others. When some people maintain that dogs dream, they only state a fanciful and private opinion.

The medical group of psycho-analysts are undoubtedly right in attaching great importance to dreams and their literature is most valuable. In considering dreams I shall take most of their work on the pathological side for granted, merely emphasizing another side of dreams to which I believe that not enough attention has been paid.

In spite of the fact that we cannot now criticize nor analyse them, I attach great importance to one or two historical dreams, which I venture to interpret largely by their results. Among these I mention without comment the dream of Joseph, the husband of Mary, and another of the wife of Pilate. Two more famous dreams I wish to take and consider as genuine in the form wherein we have received them from their relaters: St. Paul's dream, which has been closely analysed by Renan in *Les Apôtres*, and the dream of St. Augustine, about which there are some interesting comments to be made. By far the most interesting of historical dreams is that of Descartes, already mentioned, where we can read into the minute account he has given us of it some very pertinent information derived from the general history of the time.

So much has recently been written about dreams that a brief statement of classification seems to me to be necessary, if only to indicate those which I propose to leave alone. I venture to submit an assignment in six divisions, defined according to their subject-matter, with special reference to their probable extra-conscious origin in each case. My arrangement was at first psychological without any reference to the supposed extra-conscious origin of their inspiration. I attempted to allot them in groups according to their content. Subsequently I found out by accident that a division of dreams by their content fell into an interesting series, fitting with tolerable completeness into another classification, corresponding with my analysis of duality, either instinctive-intuitional or cortico-thalamic, whichever we may prefer to call it. There is only one among them, the last on the list, where I see no clear indication of origin.

So far as I know, there has been no anticipation of my six divisions of dreams, but I am interested to find that my interpretation of their nature was to a certain extent not quite novel. I recognized it in *The Mind in Sleep*, by Mr. R. F. Fortune, where the author gives a close analysis and partial criticism of the Freudian theory of dreams. After Dr. Rivers' brilliant *Conflict and Dream*, this book seems to me the best short work surveying the whole subject. Mr. Fortune to some extent anticipates my own theory by suggesting a domination of the self by the emotions, as the basis of most dreams, wherein I believe him to be to a large extent correct. 'The organization of emotion about an object is the normal mode of working of the waking mind,' he writes. 'The organization of objects about an emotion, on the other hand, is a normal mode of working of the dreaming mind.'[1] His view would account for the long series of thalamic dreams, which I have classified as (3), (4), and (5). But he would only explain half of the highly complicated case of Descartes, and would leave out of consideration altogether the small number of infinitely important cortical dreams, classed as (1) and (2). He makes no mention of the anticipatory class of dreams, included under (6).

I may add that Mr. Fortune gives all the credit to the Freudian formulas and symbolism that they deserve and perhaps a little more. Few people are likely to adopt them literally and completely now that their novelty has worn off.

In the first class (1) will be contained dreams with an intuitive-intellectual solution of some problem. They are more frequent than is generally allowed, since few people care to record them. Their value cannot be over-estimated. As a physical explanation we may consider them to have a cortical origin. They have been dealt with at some length, as clear cases of intuition, in Chapter V. The cases of Poincaré and Srinivasa Ramanudjan may be taken as typical. More complicated cases of the same origin, which have been worked up by genius into long allegories, should be added to these, such as the dreams which both Plato and Plutarch have adapted at length in their writings. I have no doubt that these philosophical solutions of long-standing difficulties were first suggested in dreams fairly similar to the form in which they were related. More purely intellectual and of a dream nature were the three mystic revelations of truth received by Plotinus and the two or perhaps three occasions on which Spinoza perceived the truth by intuition, 'ipsâ purâ mente extra verba et imagines'.

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[1] See p. 88.

Secondly come (2) mixed cases, where an intellectual revelation is granted or obtained by intuition after a period of emotional stress, arising from outside and enhanced by unconnected circumstances. Here the content appears to be cortical, while the stimulus is thalamic in origin. The most striking instance I can put forward is the dream of Descartes, already mentioned, to which I will return again. It is not often that we can find a perfectly clear case of important intellectual content produced under emotional strain. For an opposite kind of case see Pascal's dream of November 23, 1654, no doubt inspired by the example of Descartes, with comments by Chevalier,[1] and Maurice Barrès.

The third class (3) includes more numerous cases of high emotional origin, where the instinctive and intellectual elements are equally pertinent and present in combination. The matter and the manner are thoroughly mingled. They are the frequent source of vision and of religious revelation. Here the emotional content does not exclude some intellectual and/or intuitional element, as can be very clearly seen in two visions, of which we know a great deal, those of St. Paul and St. Augustine.

I should certainly admit in this group the elaborate allegories of Dante and Bunyan, as I have no doubt at all from internal evidence that they are founded, like the *Timæus*, on real dreams, or very possibly on dreams in series. Dante's two beasts in the wood, before he comes to the door with the words above it, are not conscious presentations; they are rather clumsily dragged into the allegory and are not worked up like Cerberus, Plutus, etc. But while Plato's dream is an intuitional inspiration, I am convinced that the religious dreams are thalamic in origin and the result of the emotion of fear. Bunyan offers an even clearer case, for we have his own evidence that his sins did so offend the Lord, 'that even in my childhood He did scare and affright me with hideous dreams and did terrify me with dreadful visions'.

In the fourth class (4) the dreams are entirely thalamic and instinctive, containing hardly any intuitional content. They are very common and have been elaborately examined, so that I need say little more about them. We might say that they come universally under the operation of Fortune's law. They are nearly all cases of frustration, sexual or otherwise. I should add that quite as frequent as the sexual versions of frustration are those of personal humiliation, dominance forced into submission, ridiculous posture, insufficient clothing and the peculiar sensation of having just missed a clue to something vitally important.

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[1] J. C. Chevalier, *Vie de Pascal*, pp. 101–5.

The fifth class (5) is one in which St. Augustine's dream might also have been included on account of its markedly dual nature. They are by far the most important psychologically in the present issue that we are considering. The decisive characteristic of this group is the revelation of an inner contest, the strife between the thalamic and cortical elements for dominance in the personality. Instinctive self-assertion is nearly always triumphant in these contests, and the intellectual-intuitive side of character has a bad time of it. Sometimes mere duality is posed as a problem without any solution. Reversal of our ordinary wide-awake opinions and views is very frequent in dreams, as has often been pointed out before. A most notable case of this order is that of Maury, quoted by Freud.[1]

The last class (6) is one which I need only refer to briefly, since I can add nothing to what has been already published on the subject. They are prophetic dreams and M. Maeterlinck has given all available references[2] to the best evidence that has been already collected. I regard his own three dreams as more convincing than most, because they are utterly trivial and the evidence for them is well authenticated and so accidental that no one can suspect the dreamer, as in most cases one ought certainly to do, of posthumous significant embroidery or unconscious perversion of detail. If we can regard the evidence as unimpeachable, as I am willing to do, the origin of these prophetic dreams must be referred to the intuitive faculty, which would appear to be capable extra-consciously of taking a twist out of time, either backwards or forwards. They are given in his article on *La Culture des Songes*.[2]

So far as I know, scientific opinion seems to pass by the prophetic or anticipatory dream. Dr. Adler in his *Individual Psychology* gives them very brief attention, since he will not admit the view that they are practically efficient prophecies. For instance, he explains the dream of Simonides, related by Cicero, by the unconscious wish to avoid the danger of sea-travel. Simonides protectively warned himself extra-consciously—probably an instinctive act—that the ship he was about to sail on would or might sink. The fact that it did afterwards sink was a coincidence, which in a thousand other similar cases would not arrive to complete similar stories. Adler's view is that dreams tremble on the brink of prophecy by the extra-conscious efforts made in them on the part of the subject personality by way of 'preparation for confronting some problem which has presented itself'.[1] It will be remarked at once that Adler's explanation will not meet the very definite instances put forward by Maeterlinck.

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[1] *Interpretation of Dreams*, p. 61.

[2] *La Vie de l'Espace*.

After reviewing in detail the mixed case of Descartes, where instinct precipitates an emotional crisis and intuition carries out in a dream the logical conclusion of a totally separate problem, I propose to study the non-religious aspect of St. Augustine's dream for its dual element and to examine two other cases in class (5), where the double personality of the dreamer becomes conspicuously apparent in his dream. In the latter two dreams I ought perhaps to draw attention to one particular aspect, namely that they offer clear cases of introspection in dreams, which Dr. Broad says is not altogether uncommon.[2]

In Chapter V. I have already given an abstract of Descartes' version of his own dream, the contents of which may be taken as purely cortical, that is to say, that they are intellectual in material and intuitive in method. There is a brief mention of his old school at La Flèche, which gives some indication of emotional stress. In the critical revelation itself there is no bright light nor dramatic circumstance. But in the presentation of the dream, as a whole, there is considerable anticipatory dramatic preparation. The dream, though continuous, was in three parts, divided by intervals of an hour or two of meditation. In the first part he felt a violent wind, in the second stage he heard a clap of thunder, in the third the revelation comes quietly and instantaneously.

So much for the dream itself. As for the circumstances, we know:[3] (1) that Descartes had taken part in the early stages of the German Thirty Years War, as a trooper of Prince Maurice of Nassau against the Spaniards; (2) that he was on his way back from witnessing the coronation of the Emperor Ferdinand II at Frankfort; (3) that very soon after he joined the Catholic side and was serving with the army of Bavaria.

These related facts show that he was undergoing a crisis in changing his side in the religious wars of the time. Quite apart from this change of his condition, he reveals in another pamphlet, preserved by Baillet,[1] that, on the very day on which his dream occurred, he had had an emotional crisis, which he described as a state of enthusiasm brought on by fatigue in his search for truth.

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[1] *Individual Psychology*, pp. 146 n. and 219.

[2] *Mind and its Place*, p. 373.

[3] See note at end of chapter.

There is here evidence of a most remarkable kind from three sources—two separate relations and versions of his own and our own exact knowledge of the peculiar circumstances of his case—to prove that Descartes had come to no ordinary crisis of life for a young man of 23 and that his perplexities of religion and profession were complicated by an exalted mental preoccupation. From these warring mountains of emotion and ambition there crept out only the little mouse of intuition. Yet it was a mouse with a great deal of vitality.

It is perhaps sufficiently obvious that no dream is worth analysing in the psychological sense—I do not say medical—unless the evidence comes from peculiarly competent sources and unless there is some outside auxiliary circumstance to throw a borrowed light on critical points. In this respect there is only one ecstatic dream on record to compare with that of Descartes, the dream of St. Augustine. The theologian, or rather rhetorician and pagan professor, as he was at that time, was a much older man than Descartes and practised, as few have ever been, in self-examination and in exact power of expression. For outside light on his vision we must go to other passages in the writings of St. Augustine.

The great rhetorician, well versed in Plato as he was, did not hold the traditional views of duality typified by the famous black and white horses. St. Augustine recognized that body and soul were dependent on one another in the way that was afterwards adopted by St. Thomas Aquinas. But the older theologian expressed very remarkable views of the gradations of bodily, sensible, reasoning and higher powers. I cannot resist quoting a passage illustrating the ability of his psychological analysis, anticipating by many centuries any equivalent exposition or any similar attempt at exactitude. 'Thus by degrees I passed from bodies to the soul, which through the bodily senses perceives; and thence to its inward faculty, to which the bodily senses represent things external, whitherto reach the faculty of beasts, and thence again to the reasoning faculty to which what is received from the senses of the body is referred to be judged . . . rise to something still higher.'[2] It is difficult to imagine how the faculties of instinct and intuition, as standing one on each side of the intellect, could be better described without using those exact terms.

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[1] J. Chevalier, *Vie de Descartes*, pp. 40–3.

[2] *Confessions* VII, 17 (Hatzfeldt-Holt translation).

However mistaken I may be in reading back modern notions into ancient methods of expression, no one can fail to allow to an intellect of this order very remarkable powers of introspection and definition. We may therefore take St. Augustine's words in describing the details of his dream in the garden of Pontitianus near Milan as endowed with an exceptional degree of exactitude and verisimilitude of representation. Listen then to his picture of his dual self at the great moment of emotional crisis, self-criticism and self-revelation. 'But thou, O Lord, while he was speaking, didst turn me round towards myself, taking me from behind my back, where I had placed me, unwilling to observe myself, and setting me before my face.' The ecstatic state described passed by a process not elucidated into the full revelation, the details of which are more hazy.

The Milan dream I cannot put forward as a clear case of instinct pitted against intuition. We do not know enough about it. Both sides of the philosopher's self were at the moment steeped in emotion. He was not seeking an intuitive solution to an intellectual problem. Probably his older self of philosopher and rhetorician was the more intellectual of the two, while the new self of the soul, the soul of the priest and theologian, was penetrated with abounding life instincts, which he had been unable to satisfy in the old school of pagan philosophy. It seems to me to indicate very dimly the victory of highly-trained and refined instinct over a debased and rather crude form of intuitional-intellectualism. But it might conceivably be read the other way as an intuitional solution of a quite limited practical problem posed by the instinctive self. I only lay stress on the duality, the vivid sense of internal strife, the gigantic effort at a new and spiritual self-knowledge.

The following two dreams were communicated to me by the same observer, whose work took him in and about Fleet Street and the City of London. In one case a note of the details was made at the time; in the other it was described immediately afterwards. A strong suggestion of duality of self penetrates both cases, but no special indication is given of thalamo-cortical rivalry. In the first case the dual self is so marked that a Freudian would criticize my interpretation as being too obvious, and might search for a hidden meaning. In both cases the duality is suggested by a contest between two opposite personalities, both obviously inspired by the subject. The second case is rendered out of the common by the fact that the observer remarked together two unusual features of dreams, unusual that is to say for him, although both are known frequently to occur. He introspected his own dream and knew that he was dreaming. He also found his dream interrupted and renewed it again at the same point.

The dreamer was out of work and applied for an appointment at Geographia Ltd., a firm whose office is in Fleet Street, on the same side and not far from the opening of Bouverie Street. On entering he saw in the office chair a printer, whom he knew by sight but did not expect to see there. He was at once uncomfortably aware that he would be criticized and that all his faults were known. Mentally he recapitulated to himself his three worst and most outrageous deficiencies. Almost at once the printer began speaking to very much the same effect, as expected, but in a totally different manner and much more offensively. My friend's shortcomings were brutally, acutely and powerfully put, to his own very great surprise and discomfiture. He was just about to be dismissed when the dream ended. It seemed that the intuitive self was giving a very heavy snub to the instinctive self.

The other incident was placed by him exactly in the last house on the eastern side towards the southern end of Bedford Row, W.C.1, a stamping-ground of lawyers. The dreamer and his wife drove up in a cab to consult a solicitor, leaving the cab outside. On entering the house one thing led to another, business was finished, an invitation to stay was pressed, there was a large collection of pictures to be seen, with a string of other irrelevancies. On leaving the house with his wife the dreamer found the cabman still waiting and an awkward scene ensued. The cabman claimed a day's earnings, forty shillings, and the dreamer offered half a crown an hour for twelve hours or thirty shillings.

In the dispute that followed the dreamer became angry and with his emotion he became aware that he was dreaming. So he turned dictatorially to the cabman and said: 'You know that this is a dream, and that if I wake up, you will get nothing at all. I will not give you more than thirty shillings.' The cabman replied civilly but stubbornly: 'I am very sorry, Sir, but I won't take less than two pounds.' 'Very well,' said the dreamer, 'then I shall wake up.'

So he awoke and looked round the bedroom in the dim light. He remembered the dream with a chuckle, turned over, fell asleep and found the cabman still in front of him in the same place.

'So you see,' he said to the cabman, 'I can wake up when I like. I offer you thirty shillings once more and it will be your last chance. Will you take it?' 'No,' said the cabman, 'I won't.' So the dreamer awoke again and reflected that the cabman had had the best of it.

In this dream, which is clearly a dream of frustration, the thwarting of the will by some obstinate internal resolution is probably indicated by the cabman. So far as I could ascertain by questioning the dreamer, there were none of the technical Freudian symbols indicating a possible contorted interpretation in either case. In my opinion the most powerful instincts in human nature, except at a certain time of life, concern domination and having one's own way. The contrary and complimentary instinct present in most of us, but kept usually in the background, is the submissve instinct. Both the two dreams turn on a conflict of the dominant and submissive tendencies within the self. If the first dream indicates an exulting and offensive trampling down of the instinctive self by the intuitive faculty, a possible explanation of the second dream might suppose a stubborn resistance of the instinct to intuitive dictation. The two dreams had no connection and occurred a long time apart from one another.

In the cases above referred to not all the phenomena are indisputably dream cases. Spinoza's intuition and the revelations of Plotinus are on the margin between reverie and vision. The preliminary seizure of St. Augustine occurred while his friend was talking to him and only passed into vision or revelation by a voice at a later stage. It is wiser therefore to consider them only partially as extra-conscious occurrences and partially as mixed states.

Mixed states are very difficult to deal with, because they are innumerable, indefinite and subject to very grave doubt as to authenticity. Each of us on introspection must wonder very much what states of inspiration, reverie, and unassociated thinking may mean; where they begin and where they end are just the moments that are unseizable. Mixed states are much less definite than dreams.

Formal classification is therefore of no great value, but I will venture to indicate several kinds. The most usual mixed state is sleep-waking, when the observer or patient is in a state of excessive suggestibility by Coué methods or otherwise. To the reality of Coué methods, when applied with care, I credit the greatest validity and I can believe also that their value is considerable even in ordinary wide-awake states.

Inspiration and prophecy are particular adaptations of the reverie and sleep-waking states, enhanced by special training, as in the Israelite 'schools of the prophets'. Incantation and hypnotism are inducement of similar states by external influence. Prayer enhanced by fasting leads to exaltation purged of many of the grosser forms of egoism and error; probably, too, it includes voluntary submission of the spirit, which may be considered tantamount to a mixed state.

The most fashionable form of mixed states, which have probably increased in recent years, have been the complexes. Undoubtedly some are natural and unavoidable, but some are induced by unnecessary self-surrender. Most complexes are simple instances of the capture of the self as a whole by powerful instinctive impulses. The instinctive faculty has been encouraged by modern education, by public opinion, which forgives everything to youth and vigour, by the apologetic attitude of the old, who have nothing to say for themselves after enduring a long period of inaction throughout the great European War and by the increased freedom and growing power of women. Instinctive activities have in many individuals run away with the energies of the whole system, have overborne the intellectual powers and have turned a deaf ear to intuitive remonstrances.

Complexes have been sufficiently defined in a sense, but I am not sure that I can adopt any of the descriptions given, not even that of Rivers. They seem to be violent mixed states or mixed states with elements of potential violence, borrowing extra-conscious elements, always instinctive in character, to complicate conscious situations already difficult enough without them. They are features of self-development which the will was intended by reason to control.

As for the will, I take a working description of it to be the reconciliation of instinctive activities with cortical control, so as to enable a continuous and consistent course of action to be carried out. There are many other ways of putting it but none of them easy. It is probable that in the near future some radical revision will have to be made in characterizing that particular form of activity called voluntary. It may have to be recast to suit the advances in modern knowledge of the brain.

To begin with, no one has yet ventured to consider the proper way of expressing and describing the preparation for action of a complicated dual double machine, each half having its own system of sensation and its own form of intelligence. The definition would have to include protopathic and epicritic sensibility with thalamic and cortical control, all uniting to pull the important strings of one motor system. Of the lesser and far more numerous subterranean motives, what Leibniz called 'the small dark motions of the soul', or the comparatively irresponsible movements of limbs and servile organs, nothing need be said for the present in this connection. For the immediate will has enough to do without taking cognizance of these particulars, which have to be controlled by prolonged and systematic methods, compounded of foresight and consistency.

Although complexes may have become more vulgar and more numerous with the added pace and stress of modern life, they are not essentially new. The right treatment for them is the exercise of the will, with a certain dose of patience and humility and the habit of regarding them as neither very unusual phenomena nor in any way interesting. Otherwise they become material for the pathologists. Since in that quarter they have been studied for some twenty years with extreme care and much scientific discernment, they do not need any particular examination by the psychologist or attention from the philosopher.

If later on I venture or feel reluctantly obliged to consider or to attempt to characterize the unity of the active personality in the form of will, it will only be, it can only be, accomplished after the exact state of the physical organs in the thalamic and cerebral regions have been elaborately examined. The unity of the mind is, however, a question which forces itself upon me at once, as a matter of introspection. In the following chapter I have to look for evidence of duality in consciousness and, if these equivocal phenomena appear in numerous small instances, as they will, or in a few immediately important ones, as they may, the whole problem will be suddenly reversed.

We may have to consider, before turning our attention to the physical side of the brain, whether there is unity of the mind in each ordinary human personality at all and/or whether such a unity is to be considered as part of a larger and more valid unity or not.

In the first of these problems it will appear reasonably certain that, as most people suppose, the unity of the human mind can be held to be a significant reality, well able to hold its own in relation to and with other unities of the same kind.

The second of these problems is far more difficult to solve. There is every reason to believe that the bond between human minds in this world, as we know it, is stronger than the surface appearance of our human relations generally leads us to suppose. But the bond does not seem to be so strong as to injure the unity of the individual mind, nor to destroy the singleness of personal character to an extent which would make the study of the individual human brain a matter of departmental interest in comparative physiology.

Looking back for guidance among the older philosophers, it is interesting to note that Spinoza's sublime indifference to the personal will always leaves his system the least shaken by any new turn in the path of introspection and investigation. Among the moderns M. Blondel has courageously anticipated and faced the difficulties, which may arise in the future from any split or disintegration of our personality, in the way which may probably best meet the criticism of posterity.

NOTE I

To avoid overloading the account of Descartes' dream in the text, I have omitted three relevant contributing circumstances, all of which add to the extraordinary tension of his position both at the time and for some time later.

(1) The position of a young French Catholic soldier taking part in the Thirty Years War was peculiar. French policy at the beginning of the war in 1618 was anti-Spanish; at the end of the war in 1648 it was anti-Austrian. During the whole period the policy of France was dictated solely by her national interests and on the religious side of the question she showed herself indifferentist. It accounts for the peculiar tone of detachment with which Descartes began his narrative of the dream: 'J'étais alors en Allemagne, où l'occasion des guerres, qui n'y sont pas encore finies, m'avait appelé. . . .' Are not these words extraordinary in the mouth of a young Jesuit scholar, who had taken part in the war on both sides! Truly the passage suggests: 'A plague on both your houses.'

(2) In the interval between the first and second parts of the dream he reflected for a period of two hours 'sur les biens et les maux de ce monde'. If we conceive the question of his career mixed up with the great issues in his mind of French *v.* Spanish power, the candidature of the Elector Palatine for the Bohemian crown and the growing importance of the religious strife in Germany and Europe as a whole, we can be sure that Descartes had enough to think about.

(3) Just a year and a day after his dream of intuition Descartes notes in his MSS. dated November 11, 1620, of *Olympica*, recorded by Baillet, that: 'I have begun to understand an admirable invention'. Professor Chevalier tells us that this referred to a discovery in optics and calls attention to the significance of the date, exactly one year and a day after the dream and three days after the battle of the White Mountain outside Prague, where the fortunes of the Protestant party and the winter-king of Bohemia suffered a complete eclipse. Soon afterwards Descartes gave up soldiering.

NOTE II

Some days after the completion of the present book and during the course of typing out the script I had a dream, which I interpreted to be a dream indicating the perplexing character of Intuition. The date was 11.6.28.

I was considerably puzzled about a number of difficult questions. In my dream I was aware of a special office in the L.M.S. Railway, which solved difficulties, which had to be prepared in a special form. I sent in a bundle of six or eight with my proposed solutions, each in a separate parcel differently wrapped up.

They were all deposited one evening according to my dream. On calling the next day a corresponding bundle of judgments on my answers was handed to me. Only the answers without the questions, thrust out at me in confusion. A, right; B, wrong; C, mixed up, etc. I could make neither head nor tail of the solutions; before I could sort them out I woke up in total ignorance of the real results.

The above date was taken down with the note as a memory test. The dream was re-read on 22.7.28, when it had been entirely forgotten. Every dream is essentially a problem of memory, as well as of our unconscious, semi-conscious and conscious sensations.

The especial characteristic of all intuitional solutions of problems is their evanescent existence. The solution is given independently of the problem and the latter has often to be recaptured backwards from the former. Memory has no hold at all on the first item of the relation, very little on the connecting link and only a momentary clear definition of the second member or item of the relation.

CHAPTER XVI

DUALITY WITHIN CONSCIOUS EXPERIENCES—SELF-KNOWLEDGE—UNITY OF MINDS

Consciousness is a very real phenomenon, even if the definition of it is elusive. If we enter unawares into consciousness, it very soon becomes an insistent fact and colours every mental process with vividness and some distinction. Consequently any evidence of duality in conscious mental processes, that can be detected, deserves rigorous criticism and must be subjected to severer tests than the rather sympathetic and perhaps credulous handling accorded to any evidence of duality, which has been suggested in imperfectly conscious states.

Such differences as occur between thought and feeling, pleasantness and unpleasantness and other dualities, which have been already examined, must be ruled out. The kind of duality which is characterized as mental, does not so much accentuate differences of quality, as differences of origin. We are looking for evidence which implies that two forms of intelligence are at work in one cranial equipment. Self-knowledge, if it can be clearly established, would be an event of that order and a specially important fact that might well be left for consideration, until we can collect the minor facts which lead up to the greater ones.

I will therefore deal first with a whole group of auxiliary dualities, where one form of intelligence or faculty seems to come to aid or supplement the work of the other. The prominent and most common characteristic of all this group, of which I can enumerate eight varieties, seems to be, that, while one faculty is absorbed in operating as an executive force, the other faculty intervenes with a relevant outside judgment, solely or chiefly from the point of view of co-operation. It cannot be denied that one or two among these cases attain great individual importance, meriting separate treatment, but their method of working is so much analogous to that of humbler everyday cases that I think a classification common to them all is the right way of treating them and of grouping them at present. It is very possible that I am under-estimating their numbers.

The first is the extraordinary power which the mind has in grasping the separate significance of individual features of a class of sensations and of being also aware of a number of them at once. Time, weight, space and I dare say other important things are thus brought close to us.

The second is the peculiar indirect control we have over physical operations, which normally are independent of our will. We cannot make ourselves awake or sleep or digest, but we can set one part of ourselves to produce favourable conditions for these purposes, so that they are carried out intelligently for us without consciousness.

The third, fourth and fifth processes resemble one another. We can set an extra-conscious mechanism at work to remind us of things, to count things for us and to check us occasionally for some purpose outside our immediate consciousness.

The sixth is a case, so strongly marked as sometimes to seem almost an exaggeration, in checking conduct by codes of professional rectitude, merit, honour, morality, and spiritual elevation. These codes are perfected within us by education, by conscious effort and by unconscious habit and kept lying in wait to preserve limits for our executive capacity, so that the intelligence of the latter is not kept worrying about details.

The seventh and eighth are mysterious engines of judgment, which cannot be briefly described. They seem to be purely intellectual in character, which is sufficient to distinguish them from the various shades of class six. They are solely estimators of quantity without any apparent suggestion of acting as a monitor, such as is the impression given to us, for instance, by the moral conscience. One of the pair registers a balance of relative satisfaction in circumstances of fluctuating sensation, while the other keeps an estimate of prospective effort and reward, releasing energies in proportion as they are required for any purpose.

Before running over these cases a second time in some detail, it may be well to say that, although in each case the existence of dual influence or dual activity is clear, it is perhaps premature to assign the parts played by each of the only two possible actors or factors concerned. Our argument has gone so far as to assert that there is only one mental and physical duality and that there is proof of only two intelligences engaged, and for the present with that result we shall have to be satisfied, as we can pretend to be no more than on the brink of discovery. To attempt to decide all the doubtful points together may lead us to unnecessary confusion.

In consciousness the straightforward work of life goes on, under the special conditions which we now have to consider, energized by one active faculty and guarded extra-consciously by the other faculty. Is there always one operating agent, such as instinct, and one consultant intelligence, such as intuition? Would it not be rash at this stage to decide? I have a presumption that power lies with instinct, which is undoubtedly associated with the cruder and more ruthless sensations, as we shall see later on. I have also a similar warrant for believing that delicate epicritic sensibility is associated with the cortical hemispheres, with reason and intellect and with the faculty of intuition. Let us for the present carry the argument no farther than this, that in some way the two intelligent systems are engaged in working for our benefit by various modes of co-operation within and without consciousness.

The magnitude and delicacy of the problem makes it impossible to leave the particular issue otherwise than open. The very first case we have to consider covers an enormous number of facts and it is by no means certain that all the processes concerned are operated on one single pattern. The bulk of the work of the special senses is thus divided between one form of apprehension, which observes, if it does not assemble, all detailed items, and another form of comprehension, which never loses from its attention the collective relations of particulars, destined otherwise by their natural divergent tendencies to fall apart.

In the immense field of the special senses there has been developed, not without some poetry and rhetoric, a very strong argument in favour of the double interpretation of the successive sensations, which come to us in the stream of consciousness. Two French philosophers, Professors Bergson and Blondel, have constructed for it a case that is almost irrefutable, as a whole, both as regards time and duration, weight and to a certain extent also in space. I cannot admit all M. Bergson's arguments, but certainly to him is due the chief part of the credit for recognizing the special faculty involved in seizing the continuity of time as apart from its conventional and mathematical elements. He has invented a picturesque phrase for this characteristic of enduring time, 'intensity',[1] a kind of 'quality of quantity',[1] which is perceived by the inner self. The operation is thus described: 'Au-dessous de la durée homogène, symbole extensif de la durée vraie, une psychologie attentive démêle une durée dont les moments hétérogènes se pénétrent.' [2] M. Blondel, who pointed out that the perception of weight was necessarily subject to the same conditions as that of time, writes more soberly, but perhaps more effectively on the general issue: 'Ce qui est donné comme unité multiple, ce qui est *tout à la fois*, ne saurait être aperçu que par une intuition interne.' [3]

In a later work [4] M. Bergson returns to the same contention about space where he says very brilliantly: 'l'espace n'est pas plus en dehors de nous qu'en nous . . . il n'appartient pas à un groupe privilégié de sensations.' For space he postulates a quality, 'étendue concrète', parallel to 'durée', where diversity of colour and relief are apparent, which he opposes to 'extension', placed on a lower level with pedestrian time and with everything that science teaches us how to cut to pieces. A similar but wider phrase comes from Blondel: 'Nous ne sommes pas dans le temps et dans l'espace, c'est l'espace et le temps qui sont en nous.' [5]

Space-perception does not so easily lend itself to romantic treatment as does time, but here perhaps Sir John Parsons steps in with a measure of severe accuracy to afford unexpected support to a case which he did not set out to prove. It may not at all be voluntary support and I should hesitate to assume that he shared my views or that he would agree with some of the conclusions that I venture to draw from his observations.

In the beginning of Chapter VIII of his great work on Perception, Sir John raises the problem of transmission to posterity of acquired characteristics, provided that these belong to *logically*

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[1] Not to confuse my own interpretation of 'intensity' with that of Bergson, which I may not have grasped correctly, I should like to explain what I mean by the word in a metaphor, which I have used later on in the text of the present chapter. I imagine the instinctive intelligence as throwing a small gleam of illumination on mental events, second by second, as they pass in consciousness. I imagine a larger and perhaps a fainter light thrown by the intuitive intelligence on the events of several successive points together, thus intensifying the apprehensive capacity of consciousness so long as and wherever the two lights coincide. One feature of 'intensity' from the mental side is that it arouses attention, by which so large a part is played in perception.

[2] *Données Immédiates de la Conscience* (1889), pp. 68, 95, 97.

[3] *L'Action* (1893), pp. 68, 98.

[4] *Matière et Mémoire* (1896), pp. 240–3.

[5] *L'Action*, p. 334.

useful characters. His motive in admitting the possibility of doctrines, usually held to be unscientific, arises from a difficulty in his own special researches, which fellow-workers in the study of space-perception have felt before him. He writes that there is a tendency to-day: 'to attribute many of the essential factors of space-perception to inherited characteristics. The attempt to explain them as the result of learning by experience, founded on proprio-ceptive and other impulses consciously felt or unconsciously felt and co-ordinated, such as appreciation of impulses derived from the extrinsic ocular muscles as a guide to the position of the eyes, appreciation of degree of accommodation as a guide to estimation of distance, and so on, is generally felt to have failed.'[1]

Taking space-perception as dominated by vision in normal people, Parsons looks around for psychological help such as may be provided in neural paths suitable for fixing the attention. Having made the provisional concession about heredity, he considers that we are free to search for the germs of the guiding factors in human space-perception, where they are most likely to be found, as in the vertebrate and other ancestors of man, however they may have been come by. 'We may expect to find', he continues, 'that in these ancestral types proprio-ceptive and other impulses, which in man have no proved concomitant in consciousness, provide conscious guidance which contributes materially to space perception.'

As a result of his search Sir John notes the growing importance of attention, as a mental quality or capacity innate in us, which seems independent of ocular mechanism. 'Attention in higher animals appears, in some manner which we cannot at present fathom, to short-circuit and replace the functions performed by factors, which have been phylogenetically suppressed.'

Binocular vision in man provides a sense of depth, develops tridimensional space and secures ego-centric localization. I understand Sir John Parsons to conclude with a definite emphasis on the dual phylogenetic and ontogenetic principles underlying diverse psychological processes, which interact with and modify each other. The earlier is primitive, but is not overlaid or superseded by the other. The younger system is superior in organization, but it cannot be deduced by experience from the first. It is rather the development of special innervations, implying a higher self-education innate in the human system as a whole.

To amend or correct Sir John's view on any technical matter is beyond my pretensions, but on the general question of logic, in order to account for space-perception, I do not find it necessary to follow him in his provisional concession as to inheritance of acquired characteristics. The explanation may be simpler. I am quite prepared to find the cortical intelligence developed on its own side—the mental side as apart from its share in perception—with its own history in accordance with the generally acknowledged laws of evolution. After it has been mentally developed, the cortex is then free to lend its co-ordinating power to help the cruder sensory capacities of the separately evolved thalamic region. Let us leave it at that.

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[1] *Perception*, pp. 145–7, 156, 159, 160.

It appears to me that the cortical faculty of intuition may certainly appear in man with the capacity of attention individually evolved and with the inclination to use it. It is ready to co-operate with the senses in a synthetic direction, equipped with the power of inner appreciation of space, as a concrete reality. The extra-conscious apprehension of its own body by the cortical intelligence cannot be without result. It must realize itself as having linear paths for travelling sensations, circular and other areas for surface pains, cubic hollows for food in various forms, which will have educated the intuition to apply attention at the right moment in order to aid the visual and other senses to appreciate particular conditions each by its special innate capacity.[1]

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[1] It is very difficult to avoid misusing the word, education. Education proper must take place during a single life; yet the word is convenient as implying some kind of improvement from life to life. I hope that my clumsy wording and phrasing will not lead to my being here misunderstood to say, that the intuitive power of the mind has been literally educated and evolved by training to understand the feeling of internal space by experiences in successive lives of inner sensations, such as chewing and swallowing. That would imply the inheritance of acquired characteristics, which I certainly do not affirm.

What I mean is that our intuitive faculty, having been evolved by selection to cope with manifold problems, is finally equal to the abstract task of presuming three-dimensional space from internal movements of the body, so that it can add a third dimension in space-perception intuitively to the two dimensions provided for it by sight. Each separate intuitive faculty also comes into the world ripe for its own individual education.

Parsons holds that 'protensity', i.e. the time element, is specially prominent in conjunction with 'extensity' in the perception of movement; and in this respect 'it is comparable to "melody" in hearing'. (*Introduction to Perception*, p. 162.)

J. Loeb, following Hermann and Mach, writes that a trained ear is able to decompose a compound *Klang* into its simple harmonic constitu-

Space-perception is the result of intelligent powers applied simultaneously by conscious experience in the senses and in extra-conscious fashion by innate intuitive aptitude. As Blondel has written: 'We are not in time and space, it is space and time which are in us.' [1] This sounds at present metaphysical, but it is a phrase which probably only anticipates future literal explanation.

One broad distinction, which must already have occurred to anyone who has followed even the curtailed account of optical differentiations, marks off space perception from perception of time and weight. The materials of the two latter are almost homogeneous and are not difficult mentally to put together. It is much more difficult to put together the visual reality of coloured surface space with the more remote sensations of relief or depth. The co-operation of the optical sense, which gives two dimensions, with the intuition, which adds a third, must be judged as being in a far more complicated and evolutionally superior order than that which offers and adds together two different qualities or intensities of the same sensory material.

The point is an important one to dwell on, since to mention the nature of the difficulty surmounted must be my excuse for not elaborating a further case about the auditory sense. The ear can consciously acquire and transmit sensations of vibration and the brain can judge the pitch and tone of musical notes, but it is probably the unconscious operation of intuition which enables us to grasp a higher unity and construct the melody. But which of the two extra-conscious partners should be credited with the intermediate form of harmony?

The second class of cases of mental duality, which take the form of interference with semi-conscious processes by extra-conscious methods, brings us on to a more mechanical level of experience. Evidence for manifestations or indications about complexion and digestion and so on, must be of varying value according to the good faith and capacity of the observer. It is also of a humble order, but none the less worth examining. Why and how is it that we can do so little to help, and luckily also to hinder, our vaso-motor system or the progress of food in the alimentary canal and still further on?

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ents. The interpretation of this is not easy, but it works against the idea that the character of the stimulation is something indifferent. Mere summation does not give the items of quality. (*Comparative Physiology of the Brain*, p. 300.)

[1] *L'Action*, p. 334.

It is more interesting than we suppose. The 'why' no doubt can be answered from the point of view of 'purpose' by several suggestions, such as that we are too busy to look after our blood, etc., that we should make a mess if we did and that we have also long ago forgotten how each of these things was done and how important they are. The 'how' is really an issue between our conscious reason and our extra-conscious activities.

The interesting fact about all these processes, if we take them in a lump, is that we can and do affect them, but not directly. We can learn ways of discipline, method and self-suggestion, which set some interior mechanism at work within us, whereby slowly and by some roundabout method what we steadily purpose will be effected. We can in many ways think ourselves back into general health. We can by discipline predispose ourselves to cures by faith and suggestion that may be of a startling nature.

I will confine myself to sleeping and waking. I know of people who say that they can either sleep or wake as they like, but that is a hasty judgment which seldom fits all the facts. On the other hand, most people know of several ways of getting themselves to go to sleep and of establishing new habits of waking at short notice. I found myself at one time waking accurately at a given hour in time to hear the clock, *before it had begun to strike*. The extra-conscious phenomenon, governing the whole class in this and similar cases, is the subordinate task of one of the two forms of intelligence, which accepts the duty slowly and carries it out faithfully sometimes without reference to time or occasion and/or generally to ordinary consciousness. It seems, however, to be prone to fight the obvious and ordinary will and to yield obedience to some other personification of the self.

In the next three groups of cases, the third, fourth and fifth, the power of reminding ourselves comes very close to the order given to the unconscious partner to wake us up in the morning. It is used twenty times a day, as compared with the phenomenon of waking. It is an unreliable auxiliary in early youth, faithful up to middle age and capricious with advancing years. I suppose all of my older readers will be aware of the comic case, when the reminder sometimes becomes an inhibition, when, for instance, we can remember to take a pill at any time during a meal, but never beforehand when we should take it.

The case of unconscious counting I found out conspicuously in the course of inventing complicated Coué methods for inducing sleep and so on. In repeating words automatically up to some capricious number, 15 or 25 and so on, I found myself safely abl to think of other things with the assurance that the counting would be extra-consciously done for me. I have elaborated th experiment in order to get clear away from all associated thinking and found that the counting was generally done accurately. Th use of the fingers suffices for the checking; but what does the counting?

A far more important case is that of checking alignment and accuracy of all kinds, of fitting standards to knowledge, of establishing codes of uniformity, decency and good taste. The most obvious form is that which is called a sense of locality, a phrase taken for granted, as if it explained something. There is, of course, no 'sense' of this kind, but only a general extra-conscious mode of self-warning, of controlling error of a particular kind, sharpened by conscious effort and unconscious habit. I have it very strongly, to the extent of suffering great uneasiness when I am obliged to follow wrong leadership.

The appreciation of true key in music is a particular development of it. The basis of all art and expert knowledge, of all skill in business, of 'flair', as it is called, for an occasion of advantage, of a sense of warning in danger, of tact in handling delicate situations, lies in this extra-conscious capacity, which can be refined and specialized, until it is familiarly called a second self.

Allied to this sense, as it is inaccurately called, comes forward our sixth case, which is deeply distinguished from the whole group of three owing to its powerful impregnation with emotion. The mildest form of it is a respect for a commercial code, leading up to a standard of technical excellence, as in Vatel, to professional rectitude, to military and caste honour. The highest form of controlling power of this nature lies in our moral conscience. Therein resides a moral compulsion apart and distinct from any fear of the wrath to come, a foreboding which may enhance its poignancy but not elevate its sentiment.

So well known are the vitality and force in our extra-conscious capacities, when urged by our highest subaltern powers to guard for us all that we most value, that I need not dwell on them beyond saying that we must not conclude that they are the product of a phenomenon apart from all the rest of our nature. They may rather be described as the loftiest development of a central essence, which we have with us all the time and to which we are indebted for a thousand benefits. So lofty a degree of development may be said in a sense to rise naturally but hardly easily out of our compound selves. No doubt remains that sympathetic co-ordination and the fruits of a skilled co-operation are there in order to create what we may call the fine flower of human attainment.

The real difficulty of comprehension crops up when an attempt is made to characterize the exact identity of the checking and warning function, which is the product and/or duty of the moral conscience. The presence of emotion indicates the instinctive faculty with an added touch of fierceness; the fineness of discrimination in moral issues seems hardly possible without the intervention of intuition; if we are to conclude that the moral conscience is the most intimate expression of the inner self, it may be that both instinct and intuition choose this particular ground in order to combine their extra-conscious powers to safeguard the conscious self from damage to its loftiest interests. Such a hypothesis has nothing substantial to rest upon, but it would account for the difference between weakened consciences in lives, where moral issues are neglected, and for fortified consciences, where spiritual issues are a frequent preoccupation.

It may seem almost too simple a deduction to suggest here that the result of self-discipline and consistency of moral elevation will have an even greater effect on the life of the individual than ordinary moral theories generally allow. Not only will reason acting in consciousness be lifted to greater enlightenment, but the reinforcing power of habit will be shown extra-consciously as well as consciously. Both the unseen powers of instinct and intuition will be trained into a fruitful union. One will provide force and the other guidance. Not only will there be no divided dominion between conscious and unconscious impulses, a frequent hypothesis which is generally mistaken, but the two great extra-intellectual faculties, which usually act in extra-conscious channels, will push and pull the will in unison and not in casual directions.

The co-operation of reason with two allies, instead of with two rivals or with two critics, will in the course of nature lift the scope of personality to levels on which the claims of mysticism and the potentialities of sainthood will no longer appear either fanciful or extravagant, but merely so difficult to attain that they remain for ever out of the reach of most of us.

With regard to the seventh case of dual mentality I feel less doubt; but it is far more difficult to describe, because it does not fit in with recognized ideas and in fact cuts across them in rather a demonstrative way. The extra-conscious interference with consciousness is in the present instance more in the nature of an intellectual judgment and less in the nature of an emotional monitor than in the case of moral conscience. I will call the new element or feature an indicator and balancer of pleasure-discomfort, but I shall have to go a little way round in order to afford an explanation.[1]

There is a special reason why the ordinary opposition of pleasure-pain or the more scientific dichotomy of pleasure-discomfort both lack significance from the psychological point of view. Pleasure, discomfort and pain are usually associated with specific objects, states and sensations. In general and by common consent this association is approximately justified, but not discriminative of any psychical condition of importance. What individual people care about is essentially different from any of these three factors or any specific combination or permutation of them. They seek, according to their age or temperament, a specific rate of change in interesting sensations measured according to a standard of judgments, the key to which is beyond our definite knowledge. The religions of mankind lie close to its most accurate comprehension.

By employing a metaphor I might call this standard measure an æsthesiometer, which, strictly speaking, it is not. To avoid using the old terms of pleasure, discomfort, and pain I will speak of a scale of two real sets of conditions, exactly opposed to each other. They are not pure psychical states, being summations of many mixed states. One contains all usually agreeable elements, though pain is not excluded; the other contains all the reverse, including transitory pleasure conditions. I will borrow the terms from Spinoza and call them 'lætitia et tristitia', conditions of exaltation and depression, as being the opposite poles of the aggregate quantities and qualities measured. Now the æsthesiometer measures the ups and downs and another psychical instrument, which I will call by a parallel metaphor an æsthesiostat, tends to counterbalance every up and every down with a reaction of equal amount, ultimately returning to a central normal position.

But against the renewed energies of any young healthy individual the reactions against conditions of exaltation are inadequate. Thus a slight upward situation of the temporary normal position is retained for a time by the registering needle, which may be called stable exaltation, *lætitia* or happiness, to be followed by a subsequent slow return of the temporary normal to the central or true normal point.

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[1] It will be remarked at once that I cannot altogether get away from the terms and phrase: pleasure-versus-pain-discomfort. I wish to make it clear that the opposition between them is not one of essence but appearance. The duality is neither philosophical nor psychological but functional. The following paragraphs should be read in conjunction with Chapter XI for the theory and with Chapter XVIII for the explanation of the two orders of physiological sensibility.

Then by the law of compensation there must follow a series of depressions, taking the new temporary normal down below the central normal for a time and degree equal to its earlier total elevation or to the sum of all the temporary elevations above the central normal. This period may be called *tristitia* or sorrow.

Now the æsthesiometer is linked up with and probably indicates our bodily capacity for enduring any series of pleasant and painful stimuli with minimum physical injury and without disruption of the system. Our ordinary energies in consciousness excite and supply the activity which brings the stimuli. Our duplicate intelligence, whose purpose is no doubt protective, watches the registering needle of the æsthesiometer, so to speak, works the æsthesiostat or compensating mechanism and pulls steadily towards the norm of the norm. I have elsewhere called the process a form of moral subconsciousness, but it has not the same mode of operation as the moral conscience of right and wrong, which is a totally different form of extra-conscious activity.

It remains to consider, as I have done with very little success in Chapter XI, what is the nature of these pleasant, painful and disagreeable shocks, for shocks they are. The pain shocks are now comparatively well understood. They will be almost completely understood, as soon as they can be disassociated from discomfort. Pleasure is the more elusive element. It is probably a rate of stimulation, or a change of rate or a change in the rate of change. It is, like feeling, a function of time. Both depend on a relation between the powers of the whole organism and time, the condition under which the organism works.

It is quite certain that, although people choose pleasure for an object, they do so only because it leads or appears to lead to something else, which they want and do not understand. They seek, in fact, after something stable, some more or less permanent condition and they select as a means of obtaining it another condition, whose nature it is to be necessarily unstable. On the other hand, they avoid pain without reflecting that perhaps it offers a surer path in the direction of what they really need than easier openings.

[1] *Psychological Theory of Value*, p. 103.

As to the mental duality that is implied in the self-regulating judgment of our actual pleasure condition and the maintenance of the temporary balance of our organism, there is hardly any doubt that it is instinct, with its crude sensibilities and inferior mental equipment, that pulls our will on the more obvious course, avoiding pain, cultivating pleasure and rejecting discomfort. Its untutored impulses presumably follow that order.

Intuition doubtless stands close beside its rash ally, not as a monitor like conscience, but more like a patient secretary or physician, holding the æsthesiometer and working the æsthesiostat, endeavouring to use the laws of compensation as the only physical check to the mistakes and intemperances of instinct.

It is needless perhaps to suggest that these separate personifications are hardly to be taken too seriously. Intuition as well as instinct, each nominally represents to us separate but coincident activities whose threads are theoretically kept distinct in our extra-conscious organization, where a moment's reflection will remind us that always many things are going on together at once, of which neither our attention nor our imagination can seize more than a small part.

It is certain that conscience can urge us one way and our pleasure inclinations another, while both may at other times happily pull together. Yet the combined process will not arrest the continuous operation of yet a similar but distinct tendency, what I may call briefly the estimation of effort. This I consider to be the last class of case of extra-conscious interference or guidance exerted on our conscious energies. The application of this principle is directly related with the will.

It may best be conceived as the automatic answer given to the perpetual internal question: Is it worth while? If the active answer is not ready and given promptly and decisively, the individual becomes a sluggard or indecisive in action. Many of our ordinary daily effective decisions are put down to habit, when they should rightly be attributed to something a little more intelligent, if complicated. Habit, strictly speaking, is action whose motive is entirely delegated to some facilitating neural path, whereas conscious effort may be repeated day after day without becoming easier. Cannot every one recall certain frequent duties which are always being brought up in question, perhaps at recurrent intervals, even though for years together the decision has always been the same way?

The explanation is that reference is always being made to an extra-conscious measure or estimate, balancing effort against reward or expectation of reward. Our lives are full of certain apparent habits which any day may be dropped, just as women in Europe all cut short their hair at the same time. How many boys at school decided after growing indecision to give up saying their prayers? How many times have we not, each of us, forgotten the injunction to be not weary of well-doing?

I am not writing now of a moral estimate, which is due to one form of automatic reminder, nor of the second automatic register of the balance of pleasure-discomfort being exactly experienced at any moment, but of a third automatic intelligent anticipation of whether X in the present is less than Y in the future, whether in fact Y is really equal to $X + \frac{X}{2}$ or to $X + \frac{X}{15}$ or perhaps only equal to $X - \frac{X}{37}$.

What I believe is that no man shaves himself in the morning nor woman arranges her hair in the evening without a daily repeated extra-conscious calculation of 'worth while?' in the head, which will probably at some time or other be added up as usual and be found to yield a minus instead of a plus. On the negative side it is seen in disinclination; on the positive side as alacrity. What is true of minor things is true of major things, of our business speculations, our duty to our neighbour and perhaps our attitude to religion. The willingness, which is almost a virtue, reveals its appearance in small matters. In great matters we call its positive side resilience after disappointment, perseverance after defeat, and unconquerable optimism. We praise it as patience, persistence, pertinacity and, above all, as courage.

So far I have been concerned to show that in certain groups of actions there are no doubt more that I have not named, a certain mental quality appears in a finished form, such as a judgment or a motive, and interposes itself above or in between the items or events or thoughts or acts, for which we can openly account by calling them conscious.

Now I am not yet concerned to show from which source these extra-conscious interpositions are drawn. They resemble the extra-conscious work of the instinctive faculty or of the intuitive faculty or perhaps in supreme cases of both together or even, so rapid in their course are these interventions, of one or the other alternately. I am sure that they can have no cause except from these two sources. Why, I may be asked, am I sure of the two sources and of these two only? Because, I must reply, there are no other cranial organs where operations of this kind can be carried on than those two important centres, whose nature we must further examine in the following chapters.

Let me turn for a moment to three classes of mental operation, broader and perhaps more important than those just dealt with, where interference is clear and the significant fact of duality can be more surely claimed as the probable explanation. They have been treated before, but I must mention them here, since they are certainly cases where the instinctive faculty employs its extra-conscious powers to control ordinary mental events occurring in consciousness.

Instinct has immense power over emotion. We are conscious of it in ourselves and it is a matter of observation in others. Reason itself can to a large extent repress any undue expression of feeling, policy can modify it, but probably nothing is really effective in arresting an emotional storm in full discharge except an instinctive admonition or inhibition. The experience is so common both in ourselves and others that it is hardly necessary to dwell upon it. The stronger the emotion, such as fear or anger, the lower down, so to speak, must the native inhibition begin. To use instinctive language one feels instinctively that instinct is the only available power in question.

The control of instinct over memory is more puzzling. I am inclined to hold that memory itself lies so close to intuition through their secret operations together in the cortex, that intuition cannot be trusted to guard it. What is it that preserves our health, saves us from breakdown and madness, from remembering everything always and all together? Do not the very words make the imagination reel and the brain swim with the prospect of perplexity?

It is not laziness nor fatigue that saves us, for the indolent have active memories and fatigue does not gradually stop the working brain, in the same way that we are brought bit by bit to a full stop, when we are physically tired. We are mentally most active just before the point of exhaustion. No: the only indication we have to guide us as to the process of mental guardianship is the recollection of sudden arrest, as of a veil or curtain being drawn, which seems to resemble an entanglement if we try to lift it.

I have no doubt that we are saved from mental collapse by a special vital mechanism and that nothing less powerful than the instinctive faculty will set it in motion. As to how the veil can be lifted I have already written, but I will lay stress again on the point that in resisting the energies of instinct the direct action of the will is seldom effective and an indirect method must be sought.

Finally, I come to the deepest, although not at all the most complicated, mystery in the mind of man: his instinct to use his brain, or more accurately the cerebral hemispheres. As I wrote earlier in this work, if our instinctive activities are to be regarded, for purposes of convenience, as separable faculties, as in fact separate instincts, we might consider that to use the higher form of intelligence was an important instinct and to refuse to use it was another. But such an analysis is nothing but a manner of speaking. It is safer to reckon the instinctive faculty as one and to consider that the control of the cortex of the cerebral hemispheres is a great and serious function of the said faculty. To appeal to reason and to refuse to listen to reason are phrases indicating motions of the intelligent conscious self, implying submission to urgent impulses of instinctive origin.

The mode of control of the reasoning and intuitive faculties by the energy rather than by the intelligence of the instinctive faculty is rather hard to penetrate. It seems to have power to set the two former in operation, to be able to suspend either of them or both, to look after their vital interests, as in the case of emotion and memory, and finally in all probability to combine with them in the case of moral decisions. Our moral life, supported by our moral conscience, appears to be the meeting-ground where some kind of equality and co-operation between obscure extra-conscious forces prevail. It is also the haunted region of mystery and devotion, of superstition and faith, of self-preservation and of self-sacrifice.

The supreme proof of our mental duality lies in our power of self-knowledge, a process of perception, thought and reflection, whose validity is not so easy to establish as may appear at first sight. Real self-knowledge must be distinguished from correct judgment on our own conduct, which is a matter of criticism on observed behaviour and on its presumed motives with their probable consequences. A dog, which shows confusion in being caught in some prank or offence, has the beginnings of self-criticism and of judgment on his own acts. But they are imposed on him from outside. If it is doubtful whether he thinks, it is far more improbable that he has knowledge of his own mind. The impossibility is taken for granted and probably with every justification. The evidences of our own self-knowledge form the most solid foundation for the distinction between mankind and intelligent animals.

It is not easy to say in what self-knowledge consists. The active form of it is generally called introspection. Introspection, however, in my opinion may include less or more than self-knowledge. It would not, for instance, be denied that examination of our feelings is a form of introspection, yet it is hardly self-knowledge in any complete sense.

As to the difference between thought and feeling I do not wish to go once more over the ground covered in Chapter XII. Admitting that feeling and thought can slip in and out of one another, I propose here to consider them as different things, which implies that I take them only in those stages where they are clearly apart from one another. To know is to think consistently and correctly according to some admitted or perhaps current standard of correctness. In this connection we have, then, four separate processes that can be named:

(1) To know that we feel.
(2) To feel that we feel.
(3) To feel that we know.
(4) To know that we know.

Of these four processes all may possibly be called introspection, although Dr. Broad might consider that some of the mental events under heading (1) should rather be called inspection.[1] Yet of the four I should only call the last self-knowledge.

Self-knowledge, as a term, should mean correctness of view or opinion according to the limit of our highest powers about the self or some form of our own personality, which also knows in some fashion, but does not necessarily know according to the highest possible limit of its ability. Observe, I pray, that the two standards of knowledge are not presumed to be equal. 'Perfectly to know our perfect selves as perfectly knowing' is an unendurable height of thought, if it is more than a form of words. Some latitude of imperfection and some degree of inequality is therefore allowed in my definition.

My definition would also include perforce a double intelligence in the self, a double level of intelligence in the two faculties and a double form of self-knowledge. To make matters concrete I turn to our definitions of instinct and intellect-intuition, as forms of intelligence residing in the thalamic and cortical regions respectively, and affirm that each form can according to its powers know that the other faculty knows. The two forms of self-knowledge are therefore: (*a*) instinctive knowledge with imperfect judgment of the knowledge of the intellect and the intuitive faculty; and (*b*) reasonable with intuitive knowledge of the extent of instinctive knowledge.

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[1] *Mind and its Place*, p. 315.

Instinctive knowledge is confined to narrow limits and clouded by feeling. Its knowledge of intellectual operations goes little further than its awareness of the general utility of intellectual operations (with which intuitive operations are included) to the prosperity of a joint bodily partnership. It is something more than a deeply serious opinion and yet not very much more. But it is firm.

Intellectual knowledge, reinforced by the intuitive faculty, recognizes the inferiority of instinctive intelligence and uses all its powers to inform and educate it. The reason regards instinctive knowledge as opinion with a low standard of correctness. The reason, inspired by extra-conscious intuition, is constantly endeavouring to force the lower level of instinctive knowledge up to the highest level of the capacity of the instinctive intelligence. Both together have to reckon with feeling and the tides of emotion are the outward evidence of the continual commotion within.

To deal with the various forms of (1), (2) and (3) seems to me to be the part of moral philosophy merging into poetry; religion should certainly comprehend (3), where belief becomes the preponderant element; all four naturally come under the dominion of psychology, while the theory of knowledge is specially concerned with the fourth. In all of them introspection plays a large part and the fact that introspection allows itself a picturesque margin of error makes it only more eager. The most interesting feature about introspection is, however, its duty in maintaining what I call the perpetual philosopher's dilemma: the combined existence and impossibility of self-knowledge.

Many great men, including possibly Kant, have been uneasy about the nature and possibility of self-knowledge. By allowing the general validity of introspection, without analysing it too closely, self-knowledge has generally been held to be possible. Yet is introspection, strictly speaking, possible for any thinker who holds the widely prevailing view as to the singleness and unity of mind? 'Knowing that it feels' may be possible for a single intelligence, where feeling is relegated to another organ or capacity; but 'knowing that it knows' is not.[1]

The French philosopher, Comte, has shown very notable penetration by the clearness with which he enunciated this proposition and by the firmness with which he adhered to it. 'We observe all phenomena with our minds, how then can we observe the mind itself?' This doctrine he reaffirmed in his letter to Broussais:[2] 'A man can observe his feelings, if they be not too violent, because they are not dependent on the same organ for observation; but his own intellectual activity no man can observe, for, if so, observer and object would be identical and who, in that case, would conduct the observation?' The argument is quite unanswerable.

An uncompromising position of this kind is one from which any man might weaken. I am not well acquainted with Comte's writings, but the learned French philosopher and critic, Ravaisson, remarked that Comte never wavered nor would admit that the intellect (intelligence) had any immediate or direct knowledge of itself. 'Jamais par conséquent il ne lui put venir en pensée que l'intelligence trouvât en elle-même la mesure du vrai, du bien et du beau, l'absolu par lequel s'estime le relatif.'[3]

The legitimate consequence of such fierce logic, for which the French are distinguished, has been drawn by J. Lachelier: 'Il y a donc réellement en nous une conscience intellectuelle, qui n'ajoute rien au contenu de la conscience sensible, mais qui imprime à ce contenu le sceau de l'objectivité: il faut seulement reconnaître que cette seconde conscience ne s'éveille qu'à la suite de la perception et que ce n'est que par la perception qu'elle communique avec la première.'[4]

A very interesting discussion on the validity of introspection, in the special sense of self-knowledge, can be found in Mr. Bertrand Russell's *Analysis of Mind*,[5] where he holds the scales between Professor Stout and Mr. Knight Dunlap, whom I take to be a modern Behaviourist. Stout is attacked for not clearly distinguishing between the mind as observer and observed in introspection. Dunlap says very acutely, that there is no provision made for observing the observer. Russell intervenes by admitting that with a single observer introspection is impossible; yet, on the other hand, he maintains that introspection is a fact and that we can be aware of an awareness. With both of these facts I fully agree, but I look in vain for an accurate indication from Russell of where the second observer is to be found in ourselves.

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[1] Since feeling and thought are difficult to differentiate in my view, when they are on the margin of transformation, a knowledge of feeling may seem as intangible as a knowledge of knowledge. Yet in practice it is possible abstractly out of time to be aware of a judgment in time. It is equally possible in time to judge of the validity of an abstract proposition out of time and of its immediate relevance to some personal issue.

[2] *Opuscules*, quoted by Höffding.

[3] *Philosophie en France au XIXme Siècle*, p. 68.

[4] *Psychologie et Métaphysique*, p. 150.

[5] Pp. 110–16.

William James, it is true, is brought in as a mediator, with whom Russell presumably agrees. James regarded the mind, a single mind and intelligence be it said, as subject and object at different times, thus giving it a pseudo-duality. Since the mind must drop this duality in and during introspection, it reverts to being single once more and the supposed solution is invalid. It would be a quibble to assert that the mind is subject and object at the same time, a contention which we all feel to be true without being able to justify it. Like Comte before him, Dunlap must be in the right, so long as we do not perceive and admit the existence of two independent forms of intelligence in our ordinary human personality.

My argument for the separate existence of separate intelligent centres in the thalamic region and in the cerebral hemispheres is an inversion of the irrefutable contentions of both Comte and Dunlap. Since we know that self-knowledge, in the strict sense and in other senses as well, is almost and to an extent approaching self-evidence a matter of common experience, we are obliged to conclude that we have and/or are the combination and co-operation of two forms of intelligence, the instinctive and intellectual-intuitive faculties respectively, to whose methods of working we have ample testimony in human behaviour.

Knowledge without an element of self-knowledge is practically the knowledge of an intelligent animal. It is also the kind of knowledge familiar in ordinary dreams, where thoughts and feelings stream past in separate identity very seldom arrested by a bout of reflection. To deny self-knowledge or to account for it on the basis of a single intelligence are equally impossible.

What, then, is the unity of mind, which appears to us not unplausibly as self-evident? It is a reality, but not a reality so fixed and permanent as to swallow up and efface all its constituent elements. It cannot, for instance, exclude mental operations in extra-consciousness and refuse to consider them as its own. Its central quality need not obscure for us the existence of partial mental events, such as the intellectual elements in emotion. It will not, or it ought not, to deny the reality of fugitive presentations, of lapsed memories or of many mental possibilities, which never enter into consciousness.

No one has suggested, at any rate until recently in modern philosophy, that the assertion and defence of the unity of mind was a problem that had to be treated seriously. The insistence by James on the 'stream of consciousness' has brought the problem a little more to the front, but as a matter mainly of curiosity in description. Already the ground of the puzzle is shifting a little.

Turning to the work of Professor Alexander, for instance, we find him concerned to assert the identity of a man, who goes to sleep reading Molière, with that of the same man who on awaking remembers it as a distant event in his life, where A is the present enjoyment in memory and B the remembered one of the night before.[1] Between the two there are no mental events to fill the empty stretches. The point-instants in between enter into the enjoyment, not as memories but as modifications of the present enjoyed event A and the past enjoyed event B.

The common possession of A and B by a single mind, which to my mind is the real question at issue, is assumed by the philosopher as certain. Only time continuity has been broken and has to be re-established. The actual unity of the mind, which together held A in the evening and holds B in the morning, has never been called in question, because the philosopher has never seen reason to doubt it. Although in this discussion the question of singleness of mind has been raised over a breach of consciousness and unity in that sense has been established, there is no attempt to establish unity as against the possibility of duality, the existence of which is not suspected. Yet it is a fact that only duality brings A and B together, because the instinctive intelligence sees A and B apart, while the intuitive intelligence is aware of them as together.

These are real philosophical problems, but to a psychologist there are some that are even more difficult. Ultimately the stream of consciousness is unified by the joint action of instinctive apprehension grasping the separate moments and of intuitive perception, which comprehends a few of them together at a time. Conscious reason profits by the operation of both. Professor Bergson has conquered the difficulties of time by opposing to it duration in the special sense of *durée*. With this point settled, immediately there arises a fresh problem, not only about the identity but as to the relations of the two allies. We have a right to ask if their alliance is durable, without conditions and not subject perhaps to the control of some outstanding identity, which embraces them both.

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[1] *Space, Time and Deity*, Vol. II, p. 150.

The identity of self and the unity of mind are different versions of the same cause, which has now to fight for its existence. The battle, moreover, has to be waged on two fronts, and I doubt whether either of the two contests can be said to be decided once for all. We have to determine whether on the one hand the mind is really one and not composite and on the other whether the mind may not be only a fragment of a compound or group mind.

The issues raised in this logical framework are substantially new. Their insistent uncertainty has only come prominently forward with the growing recognition of how very small a part of the whole content of the mind is illuminated for us at any moment by our fugitive consciousness. To continue an apt metaphor, already mentioned, we seem to carry in our body two small safety lamps, an instinctive apprehension, casting a minute circle of light, throwing up into vividness the disappearing mental events, second by second, and an intuitive comprehension with a larger circular beam, which perhaps enables us to see together the content of four or five seconds in the stream of happenings at the junction of the past and of the future. The focussing of these two lamps concentrically and steadily on the same area of events will enable us to prepare the elements and the material for what we call the union of mind and personality.

The focus of concentration is probably consciousness itself, under whose dominion grows up the power of reason. The two intelligent forces then become instinct and intellect, intuition being in abeyance during consciousness. Attention and will-power take over the further work hitherto carried on by extra-conscious forces.

I propose to assert the unity of the mind as a stable and stubborn fact against the opposite contention in both cases. In the present work, however, I will not support my views with any but provisional arguments. The mind is a stable unity; even its relations with its subordinate parts leave the latter with a great deal of independence. Its relations with other minds, as component parts of a great or larger whole, leave much doubt as to the powers of the controlling factor, as to the extent of its unifying influence and in fact as to whether in our present human existence we really know much about it.

A modern philosophic writer[1] has vindicated the singleness and unity of mind with an assurance which I cannot endorse, although owing to his conciseness I may be doing him injustice. He has asserted that mind, as we know it, exists in separate centres, as many as there are bodies. The work of correlation establishes two kinds of unity: (*a*) unity of personality in leadership; and (*b*) co-operative unity of different persons. In both cases unity of harmony is to be contrasted with unity of control. So much for outside influences: as to internal unity he maintains that mind is a mode of reality, known by us from the inside, to be treated essentially as a mode of behaviour.

Without traversing any of his contentions directly, I should say that he has understated all the difficulties. Although mind is generally conceived and treated as a unity in respect of and owing to its activity, I doubt whether its unity ought to be assumed as a necessary consequence of the process of self-knowledge. My argument above tends to show that to know the mind from the inside, whether the author means by this to be acquainted with its physical mechanism or with its self-observed mental behaviour, does not lead to the conclusion that it is an essential unity. By our introspection there are unveiled to us two separate intelligences constituting a unity only because their practical mental decisions cannot appear in overt or voluntary motor activity without common agreement and mutual support.

It is neither thought nor feeling that makes them one, but as Blondel has magnificently shown, solely action. While this complicated form of truth appears only after laborious study by introspection, it is much more strongly borne in upon us when we examine all the functions of the organs by which intellectual reflection, emotional forces and life activities are carried on.

Nor is the union of separate minds so much a matter of conscious co-operation as is generally assumed. We know well enough how it is done on the intellectual plane. On the instinctive plane, however, extra-conscious forces are at work, which we are only beginning to understand. There are real bonds holding groups of minds together, which common leadership will not account for, nor will traditional co-operation nor any intellectual method of communication satisfactorily explain.

The problem of a possible compound mind has been discussed with much independence by Mr. C. Delisle Burns [1] and by Professor McDougall.[2] The latter has briefly indicated two issues, which complicate our judgment as to the methods of communication between one individual and another. Narrowly, while there is some doubt as to whether relations of peculiar mental intimacy are to be interpreted by hypothetical messages called telepathy, McDougall prefers to stretch the theory of intuitive sympathy as a preferable explanation. Broadly, he discusses the rival explanations of common group feelings and ideas under two vague expressions, 'collective consciousness', which he provisionally rejects, and 'collective mind', a term which he considers will cover more of the dark corners of the problem than any other. As to the whole problem, which covers both the broad and the narrow issues mentioned, I can say but little for the present, although they are very intimately concerned with my immediate subject of instinct and intuition. When we are better informed about the nature of these two faculties and especially about their external influence as contrasted with their internal powers, I think we shall probably find that the extra-conscious workings of instinct are communicable from one individual to another to a degree unknown to the conscious intellect and beyond the powers of the intuitive faculty. It is on the economic side of human intercourse that I see most clearly evidence of common and simultaneous thinking, where open conscious interpenetration of ideas does not account for all the circumstances of the situation.

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[1] The late Professor L. T. Hobhouse, *Unity of Minds*. *Contemp. Brit. Phil.*, pp. 173–5.

Perhaps it would be a mistake not to mention here, although I cannot endorse it, an assault, not so much against the unity of the mind as against its identity. The hypothesis is as old as William Kingdom Clifford, that all creation is composed of homogeneous 'mind stuff' equally endowed with mental and material characteristics. There is a quite recent tendency to bring mind and matter together in a fashion not quite so crude, but inevitably working towards some kind of amalgamation by dwelling on the apparently spiritual qualities in matter and what I might irreverently call suggestions of a gritty substance in the make-up of mind. However that may be, I cannot recognize that in either respect any great inroads have been made in our ignorance, so that mind and matter still seem to me so far apart as to make their differences more interesting than their resemblances. I agree cordially with Dr. Broad that 'the more one insists on the community of *stuff* between mind and its objects, the more one will have to insist on the radical differences of *structure* between the two and on the emergence of new qualities in those structures, which are peculiar to mind as contrasted with matter'.[1]

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[1] *Contact between Minds.*

[2] *The Group Mind*, pp. 30, 47.

Dr. Broad's sure guidance is one to which I may very well return in summing up the theories of mind-constitution in consciousness. He distinguishes between central theories, which to my mind imply true unity of mind in the old psychological sense, and non-central theories, where some kind of break-up in the theory of mental unity is already anticipated. The centre theory group consists of two sub-groups: (*a*) pure ego theories; and (*b*) central-event theories, where stability of the mind is secured by referring our identity to a point, where the centre is a mass of bodily feeling. As this distinction is not easily explained, I am reminded by my former economic studies of a parallel division between two kinds of convertible currencies: those which depend on a gold standard and those which have adopted a standard of 'foreign exchange'. Just as a 'foreign-exchange' standard works back in a roundabout way to a gold standard but has more elasticity in the process, so in the end a mass of bodily feeling seems to me tantamount substantially to a sentient ego under another name.

The non-central theories do not surrender the idea of unity altogether but hesitate whether to adopt a 'transverse unity' of several feelings, perceptions, judgments, desires and resolves, which may occur simultaneously, or the more usual 'longitudinal unity' of a mind which bridges over the apparent separation in the various items of the William-James-stream of mental events. A special form of non-central theory, which Broad does not accept as admissible, is one which asserts that a mind is composed of its objects.[2] Such a doctrine seems also to me to surrender the idea of unity altogether.

My own theory of unity of mind does not fall within any of these categories, but arises naturally from Broad's review of the central theories, where he mentions that the main argument against them is the alleged fact that no existent centre can be directly observed.[3] Perhaps I go further in asserting that an accumulating body of evidence tends to show that there are two distinct centres whence mental events take their rise. Where, then, does unity find its opportunity and how is it effected? Let me briefly explain.

We have in the thalamic region the seat of an instinctive intelligence, not of a high order, except as compared with the intelligence of animals. Near the seat of intelligence, very near in a physical sense, is the fountain of sensation, which is immediately divided into two streams, one flowing into an end-organ of the thalamus itself, the other being relayed in minor streams to the cortex of the cerebral hemispheres.

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[1] *Mind and its Place*, p. 584. [2] *Ibid.*, pp. 558–77. [3] *Ibid.*, p. 585.

We have in the cortical region an intelligence of a very high order, humanly speaking. In consciousness this intelligence is called reason. Whenever it works extra-consciously, it probably corresponds to what most people mean by the word intuition. Most of the messages of sensation, except those of smell, reach the higher brain after a process of selection. We have not yet determined how that selection is carried out, but it seems to rest quite possibly to some extent on the discretion of the instinctive intelligence.

The cortex thus depends on the thalamus for most of its material. On the other hand, the thalamic region depends entirely on the cortex for any central control over the motor system, whose physical starting-points lie in the higher region. Unity of mind and body thus depends on strict co-ordination between the two regional faculties. Such co-ordination is to be found in one direction only, where instantaneous unity is necessary action. As to the higher kind of unity implied by the terms continuity of action and consistency of purpose, these can only be brought about by permanent alliance on satisfactory terms between the two centres of intelligence.

The unity of mind, I conclude, is not an artificial affair nor a factitious compromise nor that kind of an alliance which is essentially unstable because its purpose is fugitive and limited or because its motive is unworthy of the two constituent powers. The unity of mind is organic and arises from its organic history, wherein it is abundantly clear that the superior of the two governing centres is the younger and has been developed owing to the growing needs of the human organism as a whole.

It is a noble unity obtained with difficulty and maintained only by consistent effort. What Professor Pringle-Pattison has finely said of the moral self is likewise true of mental unity and consistency, which is closely allied to it. ‘A true self comes into being as the result of continuous effort, and the same effort is needed to hold it together and ensure its maintenance; for the danger of disintegration is always present.’ That Pringle-Pattison had in view also the same difficulty in regard to the mind itself appears from his remark on the following page: 'Nothing seems more fatally easy than the dissolution in this fashion of the coherent unity which we call a mind. . . .'[1] The moral and mental unity of mind is a provisional reality conditional on some other factors, those factors which we usually call will when they are organically assembled.

Now we may well ask on what terms and conditions can the constituents of will-power be successfully assembled. The answer lies outside my present task. They can be gathered temporarily in our daily experience for purposes of limited intention. The conditions of their permanent union are not easy to satisfy, because they are probably rare. Let me indicate one direction in which the difficulties of the situation are seriously reviewed and one very famous solution suggested.

There is a passage from Plato which has puzzled me, not on account of its literal meaning, but because I wonder whether it is true in a wider or narrower sense. 'The true penalty of wrong-doing is one that cannot be escaped. There are two patterns eternally set before men, the one blessed and divine, the other godless and wretched; and in their folly and infatuation the evil-doers do not see that they are growing like the one and unlike the other by reason of their evil deeds. The penalty is that they lead a life answering to the pattern which they resemble.'[2] The problem which this passage suggests to me turns on the number of the patterns, which Plato asserts to be two. But why are there only two? Common sense would tend to return a different answer, though not necessarily a right one, that there are conduct-patterns and ideal-patterns known to be existent and stable between the two extremes.

The theory is not, however, to be disregarded that in fact there are only two stable patterns. The theory would seem to indicate a true dualism, a supernatural duality superimposed on a natural duality. It posits the existence of two great powers and only two roads along which they can meet with any chance of firm, effective and consistent co-operation. Let me translate this into cortico-thalamic terms or the language of instinct, intellect and intuition.

It would seem to mean that the choice of either of the two roads in imposing stable terms of alliance would point to an implicit victory for either (1) the cortical or intuitive-intellectual system or (2) the thalamic or instinctive system. All compromises are by Plato's theory regarded as unstable, futile and inevitably makeshift failures, destined to be depressed and degraded to the more animal form of the two intelligences. There is nothing that we know of in our mechanism which lends support to this view.

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[1] *The Idea of Immortality*, pp. 196–7.

[2] *Theætetus*, p. 176.

The existence of only two formal patterns of consistent individual conduct, one self-regarding and necessarily inferior, and the other ideal in the nobler sense, where the motives of all actions are framed with the highest possible intention, would mean that all other schemes for reconciliation between the instinctive energies and the intellectual-intuitive reflections and inspirations are and can be provisional only, because they lack the elements of permanence. This doctrine seems to me not necessarily untrue. It can hardly be said to belong to the scope of argument on mental unity on which we are engaged, but it has with it a certain affinity in its most modern form.

Although the doctrine is old, it has been put forward by Maurice Blondel in terms that are substantially new. It is by him incorporated in his mystical yet psychologically accurate argument of the necessity of free will. In his view all the subsidiary determinisms, conscious and extra-conscious, lead inevitably to the one choice, where man is compulsorily free. 'La logique de l'action avait montré là perpétuelle conciliation des contraires, dans l'ordre des phénomènes, jusqu'à la contradiction finale qui impose à la volonté une option forcée.'[1] All divergent paths are one by one shut off from choice. No subordinate ties are valid. No subsidiary bargains between instinct and reason will hold good. No force will confine inclination. No intuition will bind desire. 'Vouloir et ne pas pouvoir, pouvoir et ne pas vouloir, c'est l'option même qui s'offre à la liberté: s'aimer jusqu'au mépris de Dieu, aimer Dieu jusqu'au mépris de soi.'[2]

The view thus differently expressed with eloquence and intense sincerity by Plato and Blondel is more than arresting; it is in a high degree disturbing. It does not command general assent in its conclusions, but it does impose a severe doubt as to whether there are any stable, valid rival courses to the two systems of inner harmony presented to us as extremes. Are there no intermediate methods of reconciling instinct with intellect-intuition on a basis of self-consistent will, except on one higher and one lower level? Is the humble conviction of most people mistaken that there are several paths of duty valid for each of us according to our powers, which do not imply the full and uncompromising surrender of all personal, family, racial and humanitarian ambitions?

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[1] *L'Action*, p. 420.

[2] *Ibid.*, p. 355. See note at end of chapter.

It is fair to say that these questions are beyond us and must find their answer so well as they can elsewhere. They are not part and parcel of the present study. Yet the effect of this dismissal will be to raise the subsidiary question as to why this particular issue has been considered at all in the present chapter, since something like it has been already discussed at length in Chapter XI. My justification is that the contrast between the ideal and the selfish aims of human life do closely resemble the superficial aspects of the intuitional-instinctive rivalry for the superior influence over reason. We are tempted to suppose that to follow the logic of instinct will lead the individual into a form of self-regard that becomes self-worship. The parallel supposition is that the logic of intuition will drive us to complete self-sacrifice, involving possibly non-resistance to oppression, neglect of private interests and even disregard of family ties.

Although the analogy is plausible, it is misleading. It is not thus that the extra-conscious influences of instinct and intuition work within us. The contrary pull of the black-and-white horses of Plato are an occasional and not a perpetual experience in our lives. I am prepared to leave it as an open question whether there is an essential tendency towards antagonism of instinct and intuition on broad issues. We know that at any rate they are partners and internal co-operators in many minor issues and for everyday necessities. It seems to me paradoxical to maintain that their greater tendencies are apt to belie their more frequent subordinate propensities to assist one another.

The secret of any occasional pull in different ways, of which we may be conscious, is that both instinct and intuition are forms of intelligence of unequal capacity and perhaps unlike quality, so that they may legitimately differ on the common interest of the self which they both serve. It is more than possible to hold the view sincerely and reasonably that both may have their share in raising and idealizing the purpose of our highest energies.

NOTE

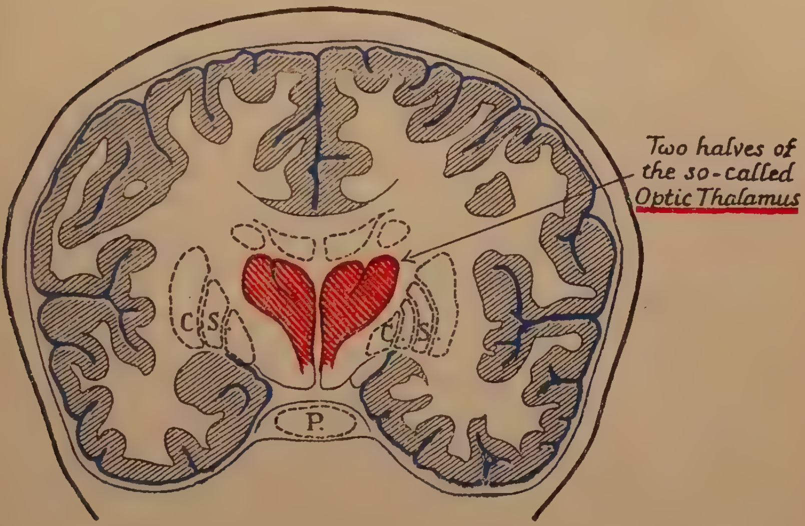
Since to many thinkers the phrase quoted from Maurice Blondel may seem devoid of psychological meaning, as representing only religious fervour or pious aspiration, I venture to express my opinion to the contrary. His view is to be interpreted as follows:

There are no stable midway courses between the intelligent working out by each individual of his own supposed interests, including a propor-

FIGURE III. A DRAWING OF

CROSS SECTION OF BOTH CEREBRAL HEMISPHERES

[in a vertical plane]



C.S. = Corpus Striatum
P. = Pituitary Body

The Optic Thalamus (coloured red) is shown relatively smaller d the Corpus Striatum rather larger than strict proportions stify.

(Drawn for Victor Horsley in 1890 *after Key and Retzius)*

tion of pleasure, and the opposite of self-surrender to an elusive ideal. In the context of the present work the course of resigning oneself to the highest guidance must mean the pursuit of truth by the faculty of intuition with the hope and faith of inspiration from sources superior to man. In psychology this course would imply:

(1) The recognition that the guidance of our conduct by the expectation of pleasure is a mechanical devotion of bodily activities to bodily needs for the realization of a purpose to be judged by some higher standard.

(2) The recognition that pleasure itself, apart from its physiological indications of bodily needs, yields no balance of pleasure over its necessary reactions. The total negative sensation-value exactly balances the whole pleasure-content.

(3) The recognition that pain has a similar physiological meaning and with its reactions the same psychological content.

(4) The recognition that our final purpose must be sought with indifference to pleasure-pain content in two directions:
  (*a*) partly from the inferior guidance of instinct; and
  (*b*) partly from the better guidance of intuition.

(5) The recognition that intuition is ultimately the supreme guide owing to the inspiration which it can draw from above. The final course must be a surrender of (*a*) to (*b*); under penalty of suffering a complete collapse of (*b*) in the power of (*a*).

In opposition to Blondel's view general opinion allows certain unknown relative values to (*a*) and (*b*) with uncertain judgments about pain and pleasure. It permits of several courses with unknown proportions of (*a*) and (*b*). In women especially the strong and healthy instincts of race-preservation cause them to depreciate the value of reason and to make the appeal to intuition less necessary. Many hasty instinctive judgments are mistakenly called intuitive.

CHAPTER XVII

THE THALAMIC, CEREBRAL AND MOTOR SYSTEMS

UNITY of mind is only part of the unity of our personality and its unique importance has been exaggerated. The state or condition is only partially captured by a considerable number of people. It is possible that those who have acquired it most certainly and completely have made sacrifices for it without being aware of all that they have lost. Whether the kind of unity which we call will is the result of the unity of mind, or, alternatively, whether unity of mind is only maintained by tenacity of will, is a problem which may to some extent depend on how each of those terms is exactly understood, or it may depend on what lessons we draw from examining our mental machinery and especially the origins of our motor activities. Behaviour indicates some kind of unity and implies a measure of unity of mind and some compromise between diverse purposes.

The result of introspection shows that concentrated thought and continuous activity are not foregone conclusions in any man. It leads us to suppose that a duality of sensations and impulses is a prime cause of variability in feeling and conduct and makes us turn naturally for help in our investigation to a renewed study of the argument from body to mind. So far as we went in Chapter X, four questions were opened up, of which two were discussed at the time relating to duality, and two more were left over for the present chapter. Of the two postponed points the more important concerned the mechanism which exists for reconciling our natural duality and for co-ordinating both sections of the duplicate system in a single united personality.

We have taken for established, or at any rate for granted, the existence of two end-organs for sensation and probably the location of two seats of mental operation. These are the cortex of the cerebral hemispheres and the essential organ of the optic thalamus. We have also discovered what is now humanly speaking very nearly a matter of certainty, that in one part of the thalamus there is a centre, whereto all sensations, except those of smell, pass directly by the fillet or channel from the spinal cord and by other neural paths from the special senses without relay or modification. In the unnamed central junction they are relayed, some passing to the end-organ in the thalamic region and some proceeding further up to the cortex.

We must now examine more carefully, although there is little to be exactly known, what that particular end-organ is, what relation it has to other parts of the thalamus and what its own subdivisions and their functions may be. The mass involved in the central or medial nucleus of the half-thalamus only is probably smaller than that of a small filbert nut. It represents the terminus of crude sensation in the human body. The refined sensations, or perhaps I should rather say, the sensations which pass off on their way to be further elaborated and refined, are separated in a small junction of cells, which Sir Henry Head for convenience calls the intercalated cell. The grouping-point has for him a very great importance.

Thence the impulses stream up for epicritic analysis and subdivision, while possibly some of them come back to reinforce or modify the crude or protopathic sensation left behind in the thalamus. Others remain to produce in the cells of the cortex those effects in consciousness about which so much has been written and so little is known. The description of this machinery will occupy the most important place in this chapter next to the detailed examination of the divisions of the thalamus and of other bodies in the lower regions of the skull. The higher brain and its cortex are left to be studied in the numerous available treatises.

How much turns on the nature of the junction where incoming sensations are crowded, whence further out-conducting paths, nerves or fibres carry off some of the congested traffic and whereto other in-conducting channels reintroduce transformed sensations, controlling messages, inductions, and inhibitions from the learned member of the partnership, we shall not fully understand until we come to the next succeeding chapters. There the further inscrutable problems of redistribution of sensations must be literally overhauled two or three times before we can make a reasonable guess as to how far our complicated ignorances extend.

Knowledge of the relative importance of the thalamus, as compared with the surrounding small bodies in what used to be called with generous carelessness the basal ganglia of the brain, is almost altogether of recent origin. The very name of optic thalamus indicated its partial connection with the organs of sight and labelled it unjustly as a secondary centre. As a fact the more important nuclei of the thalamus have very little to do with sight and the external geniculate bodies, where the greater part of the optic nerves are relegated, form only an adjunct of the thalamus proper, called the metathalamus. In the old charts of the brain you will rarely notice the thalamus marked and even Victor Horsley, lecturing in 1890 on the brain and nervous system, did not trouble to mention it once. It never came into prominence until during the present century, when the investigations of Head and his colleagues began to indicate its overwhelming importance and to draw attention to the valuable German anatomical work which had been already prepared on the subject.

In presenting Sir Henry Head's work in any form, it is impossible to do it full justice and the limits of quotation are soon exhausted. It is only a little less difficult to give sufficient credit to those who were his coadjutors in various branches of his central subject. Most of it appeared in *Brain*, Vols. XXIX to XL, from 1907–18, and a general summation of it was published in Head's *Studies in Neurology*, 1920,[1] where the massed results are presented in the magnificently impersonal form which is the fine tradition of British scientific literature. In these successive discoveries, whose value cannot be overrated, Head's own guiding intellect legitimately overshadows the very considerable share in the work taken by his brilliant collaborators. There is more than enough credit and perhaps glory in the common achievement to crown many reputations.

The work may be grouped in various ways, either according to date, or to immediate importance, or according to the more remote issues involved. Before 1907 came the lessons drawn by Head and Thompson on lesions of the spinal cord. Before 1911

[1] Next to the various original papers included in *Studies in Neurology* the popular book by the late Dr. Rivers best discusses the issues raised about sensation in an informative way (see *Instinct and the Unconscious*, 1920). But I cannot admit that the judgment of Rivers alone on many of the difficult points raised, as to the relative control of sensation by cortex and thalamus respectively, carries the same weight of authority as that of Head or shows the same grasp of all the difficulties involved. In any case the experiments in cutaneous sensation rank more as physiological data and rather less as matters of psychological and philosophical interest than the supremely important inferences drawn from the lesions of the spinal cord, of the brain and of the thalamus.

were carried out the long series of experiments on cutaneous sensation by Head and Rivers, perhaps simultaneously with researches published separately in *Brain* that year by Head and Holmes on cortical and thalamic relations. Before 1918 Head and Riddoch prepared a paper on mass-reflex and finally Head and Holmes during the War carried out an invaluable series of investigations and inferences on wounds caused during the War in or near the thalamus itself. The group of singular cases of identifiable injury, situated at the junction of two intelligent, conscious and powerful mental centres, gave the surgeons a rare opportunity, which no one but trained observers, equipped with genius and scientific patience, could have opened out for the comprehension of psychology and philosophy. His sympathetic collation of the evidence relevant to the finer issues of sensation, his collaboration in a real sense with their work by prosecuting its logical inferences throughout comparative anatomy, has added Sir John Parsons [1] in spirit to this brilliant group of researchers and nobly filled the cup of benefits for which mankind will some day sufficiently show its gratitude.

If I may venture to call them for brevity the Head researches or discoveries, I should like to try to estimate the effect of the additions brought by them to general knowledge under three counts. Of these the first two have made definite accretions to our technical knowledge more or less acceptable or accepted. The third is more doubtful, because the evidence is insufficient for a clear interpretation of the facts. When we can be certain of them, a great light will be thrown on the theory of mental duality. The important issues include:

I. The separation of two end-organs as centres for sensation and the discrimination of their functions up to a certain point. The allocation to each of the cortical and thalamic centres of a definite measure of independence in sensation with very different powers of appreciation and representation in consciousness.

II. The discovery and partial segregation of two systems in our sensibility to various sense impulses. The determination of different seats of sensation for each of these two systems and likewise a double system of paths or channels, one for each. The correlation of the simpler of these two systems with the Edinger fibre system has been made by Sir John Parsons.

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[1] I am not referring here to the technical work of Sir John Parsons on vision, which it is quite beyond my power to appraise. I merely wish to indicate my deep appreciation of the philosophic breadth with which Sir John has handled the broad issues of dyscritic and epicritic sensibility in the course of pursuing its special implications in his own field of expert knowledge.

III. The suggestion of a method of redistribution of sensibility in the thalamic region. There is no agreement as to whether this redistribution is effected in a single centre or occurs by some unknown method of division of impulses in various thalamic nuclei without central control. The apparent alternative to central arrival, central dispatch and/or central control in a definite region of the thalamus is the separate arrival and separate departure of groups of sense impulses in separate regions without any determinable principle of grouping or subdivision. The fibres involved are so small that the evidence either way is slender, but there seems to be some preponderance of argument in favour of a central system of regrouping.

My part in drawing conclusions from data admittedly incomplete as to our mental bodily equipment is necessarily that of a psychological stranger, who must take evidence as he finds it. It is not possible to give more than the briefest sketch of the evidence itself and the rest will be mostly comment and conjecture. All who recognize that psychological studies have already gone as far as introspection can take them or, as the Behaviourist School would maintain, a good deal further than reasonable probability can warrant them, will now turn to learn all they can from physiology and anatomy, remembering that evidence from the former outweighs the inferences to be drawn from the latter. Going beyond the interesting enough details given in recent psychological works,[1] as to the special senses, students must prosecute for themselves researches in the meshes of nerves and systems of sensation given by Head and Parsons [2] with their invaluable details and appropriate illustrations. All that I have the temerity to give from these great men in quotation is to be accepted as mere encouragement to others to turn to the original sources.

The four principal diagrams, which I include, are given by way of indicating cerebral localities in the roughest possible way and are taken from no single individual source. They are purposely distorted to throw certain details into prominence and there is no attempt to indicate the real proportions in size, nor the true directions of paths, nor to include all the details of any particular bodies named, such as those of the thalamus or the corpus striatum.

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[1] Such as James, Woodworth and Warren.

[2] *Opera citata passim.*

Fig. I shows a box-like caricature of the right cerebral hemisphere, which is about one and a quarter to one and a half times the real size, while the queer box inside representing the thalamus is between one and three-quarters to twice as large as the real body seen at any angle. Nor does the nominal section, called transverse, represent any possible view of the brain and its parts. The diagram is nothing more than a vehicle for conveying a few names and indicating a few representative paths. The intercalated cell and other important details are immensely exaggerated. A very poor hint has been conveyed of the immeasurable complexity of the subject-matter.

Fig. II is called a bird's-eye view of the thalamus from above. But it is three times too large and is quite imaginary in some particulars. For instance, the inner or medial geniculate body here shown is really invisible from above, as it is buried in the middle of the thalamus. But it has to be shown here, as if it could be slightly raised upwards and placed beside the ventral nucleus, since it is highly important to disclose its unique connections both ways with the cortex. It is the only sensory section, which has both thalamo-cortical and cortico-thalamic fibres. The former fibres, generally called by Parsons and others cortical projections, are indicated here with little relation to their true paths, but drawn merely to avoid the appearance of the entanglements of reality.

Fig. III is a small drawing reduced from life by Key and Retzius. It is a cross-section of both hemispheres, used by Victor Horsley for one of his Croonian lectures, at a time when the thalamus was looked upon almost as we regard our tonsils to-day, rather as a nuisance which Nature would have to improve or get rid of before another thousand years.

Fig. IV is nothing but a telephone exchange picture of the roundabout path of olfactory messages, showing the remarkable fact that the cortex, supposing it to be personified, has almost forgotten to tell the thalamus anything about the messages of smell at all. More attention is paid to the remote ganglion, called the trigonum habenulae, which lies close to the conarium epiphysidis or pineal body, than to the central assembling-point of all other sensation in the thalamus. It seems an odd freak, if it has not a special meaning.

Fig. V is a small rough sketch of what used to be called the

VIIIth cranial nerve, where two separate nerves or rather bundles of nerve fibres are known to be following paths which are almost inextricable from one another, leading to the medulla or bulb from the contiguous organs of the ear. One serves the vestibular or balancing sense and the other our auditory impulses or sensations. Fig. VI is a more elaborate version of the same subject.

My first preoccupation must be with regard to the nuclei of the thalamus and with some of the ancillary bodies, which are sometimes classed with it, inside it or outside it or named after it. The thalamus is phylogenetically old, but some parts of it are older than others. As it developed through succeeding series of animals, beginning with the metathalamus or geniculate bodies,[1] there is differentiated a major or dorsal part and a neothalamus, which, making its earliest appearance[2] in frogs, adds new and superior impulses and is transformed into the more complicated thalamus of mammals with further subtle differentiations.[3]

According to Paton: 'It was from the thalamus and other basal ganglia that the cortex cerebri originally developed and in lower vertebrates the segregation is incomplete.' . . . 'In the thalamus (in man) the ingoing fibres from the body receptors are brought into close association with those from the distance receptors of the head, the eye and the ear and in this region there is some evidence that stimulation is associated with crude modification of consciousness.'[4]

The history of the development of the thalamus in comparative anatomy is not negligible, but it is very long. It was the study of the minor parts of the brain in animals that first called its human importance to our attention. The French surgeons Vulpian and Flourens made the earliest experiments with decerebrate dogs and frogs without recognizing the special functions of the thalamus;

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[1] Parsons, *Perception*, p. 92.

[2] *Ibid.*, p. 108.

[3] Dr. Herrick writes in his *Introduction to Neurology* (p. 289): 'This mechanism is phylogenetically very old and in lower vertebrates, which lack the cerebral cortex, it is adequate to direct avoiding reactions to noxious stimuli and seeking reactions to beneficial stimuli.'

The terms dorsal thalamus and neothalamus are useful in describing the older animal forms of the thalamus, but they are confusing when applied to the perfect thalamus in man. As they often overlap with the more precise naming of the various nuclei in the thalamus proper, such as anterior, posterior, medial, ventral and lateral nuclei, not to speak of important subdivisions of the latter, like the pulvinar, I prefer to drop the earlier terms.

[4] Paton, *Human Physiology*, p. 119.

so that Schrader, in going over some of Flourens' investigations a second time, found that the French surgeon's neglect of the minor organs in the lower brain had vitiated his most weighty deductions and conclusions.[1] Since then the practical serviceability of the thalamus for many intelligent purposes in animals deprived of the cortex has been established by an immense amount of work by Sir Charles Sherrington and others.[2] A critical value attaches to these experiments, which need very careful sifting and study in detail.

Probably the oldest part of the primitive form of thalamus is the medial nucleus, where is situated that which Head and Holmes have called the end-organ of sensation, a conclusion which has been ratified by an increasing number of surgeons and students. This nucleus in the section of the right half of the thalamus in Fig. I is shown in rather more than life-size, but probably the actual end-organ of crude sensation is smaller still. Von Monakow, quoted by Parsons,[3] divides the medial nucleus of the thalamus still further into three sections: a left section (*a*), with large cells, which sends fibres to the cortex; a central section (*b*), called the 'centre median of Luys', receiving sensory fibres but sending none to the cortex; and a right or top section (*c*), which is very small with small cells and not always to be found. Since the exact functions of these subdivisions are unknown we must take a long step to the conclusion, that (*c*) is ruled out from being the end-organ, because of its fortuitous character, that (*a*) is probably not an end-organ, because of its communication with the cerebrum, and therefore that (*b*) is probably the meeting-ground of all the heavy bodily sensations and equally probably the seat of the instinctive faculty. It is separated by two centimetres at most from the pineal body or gland.

By referring to Fig. II it will be seen that central section (*b*) of the medial nucleus is apparently shut off from all outward connection with the world of the brain except with its fellow-sections (*a*) and (*c*) of the same nucleus. Section (*b*) receives impulses from the central exchange and lateral nucleus only, which it accepts as an end-organ; if in return it has any messages to send outwards, probably its only method of doing so lies through the outward-going fibres that leave section (*a*) and pass through the latticed layer to the cortex.

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[1] J. Loeb, *Comparative Physiology*, p. 139.

[2] See Lloyd Morgan, *Instinct and Experience*, pp. 73–9; also Parsons, *Perception*, pp. 18 and 138–9.

[3] See Parsons, *Perception*, p. 119, and especially the illustration taken from Kappers.

Next in importance to the medial nucleus appears to be the ventral nucleus of the thalamus, where all the sensory messages from the trunk and surface of the body are discharged through the medium of the fillet or lemniscus, which is the incoming channel from the spinal cord. It also receives impulses from important cranial nerves connected with the head and face. An important section of the ventral nucleus is the corpus subthalamicum which has no cortical projection, sending fibres only to the corpus striatum. From the other parts of the ventral nucleus copious fibres pass to the cortex and Parsons concludes that through this channel pass the greater part of the impulses which contribute to the epicritic or more delicate system of sensibility.

It is in the ventral nucleus that is situated the intercalated cell or group of cells, where it is possible that the organic redistribution of all bodily sensibility takes place. Owing to its importance it is specially noted in Fig. I according to the position indicated from the back view by Head and in Fig. II according to the position from above by Herrick.

The lateral nucleus of the thalamus adjoins the ventral nucleus and is so closely associated with it that one is practically a differentiation of the other. The lateral nucleus consists of two sections of which the lower, the pulvinar, is the less important. The pulvinar takes care of eye-messages and probably sends out impulses to the cortex which co-ordinate delicate movements of arms and fingers in relation to sight. The more important upper section of the lateral nucleus is called the latticed layer, because it is riddled through and through with fibres of passage, so that it is practically the lobby of the ventral nucleus, and most of the traffic in impulses both ways to and from the cortex passes through it.

The anterior and posterior nuclei of the thalamus are of lesser importance, so far as we know, but the opposite fact is true of the four bodies called the corpora geniculata. One of each pair is shown in Fig. II. They are not reckoned as part of the true thalamus, being bulges in its side, but are often referred to as constituting the metathalamus. They are reputed to be phylogenetically older than any. The corpus geniculatum mediale is also called the internal geniculate body. Although shown in Fig. II, it is really embedded out of sight of the bird's-eye view. It receives impulses from both sections of the VIIIth cranial nerve, conveying

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[1] Parsons, *Perception*, p. 120.

auditory and vestibular messages, and enjoys a special privilege of communication both ways with the cortex.[1]

The corpus geniculatum laterale or external geniculate body is also shown in Fig. II, but it is more complicated than it appears. It is the most important vehicle of sight, receiving three-quarters of the optic messages. It has two sections, dorsal and medial, of which only the former has direct connection with the cortex.[2]

The epithalamus is to be considered as an insignificant group, except that it contains the epiphysis or pineal body with its unknown properties. Included with it are the posterior commissure, a bundle of connecting fibres, and the trigonum habenulae, which relays olfactory sensations. The three organs are situated over the thalamus proper, as the name implies. In a corresponding position below is a little group of five organs, called the hypothalamus. They are obscure bodies, but Sir John Parsons suggests that they make up a highly important centre, subserving the emotional accompaniments of instinctive activities.[3]

The five bodies constituting the hypothalamus are the twin corpora mamillaria, the tuber cinereum, the infundibulum, the hypophysis and the optic chiasma. Of these the corpora mamillaria are junctions for olfactory sensations, each of the pair sending an offshoot to the corresponding half of the thalamus proper. The optic chiasma is the dividing junction, where optic fibres decussate or cross over to the opposite sides of the head.

The mid-brain is a far more important coadjutor of the thalamus; its most prominent constituents are two pairs of corpora quadrigemina, two superior and two inferior, known also as the anterior and posterior colliculi, or more shortly as the tectum opticum. The name opticum is derived from its function in simple or crude vision. Tectum, I suppose, is applied to it, because in animals it appears as a curved roof of refuge for a large class of receptors of static, gustatory and tactile as well as optic impulses. As the tectum has no cortical projection or fibres to the brain, its messages are presumed to end in the thalamic region and are classed as protopathic or dyscritic.[4] The tectum, though it sends no fibres to the cortex, has some coming the other way. It is therefore fitted to be the final summation of the Edinger fibre system, sending all its messages to the thalamic junction for transmission to the end-organ of the crude sensations of the body.

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[1] Parsons, *Perception*, pp. 118 and 93 (diagram).

[2] *Ibid.*, pp. 93 and 232.

[3] *Ibid.*, p. 121.

[4] Parsons, *Perception*, pp. 232, 124.

Other constituents of the mid-brain besides the tectum are the cerebral aqueduct and the two important cerebral peduncles, each of which is a group of fibres, running down from each hemisphere and forming together the brain-stem, which, after swelling out into the bulb or medulla oblongata, descends and becomes the spinal cord.

The cerebellum, as the dominating influence in balance and in the control of vestibular impulses from the labyrinth, has lately sunk back into the secondary position of a departmental organ, just as the thalamus has simultaneously risen to be in the front rank. The medulla oblongata, familiarly called the bulb, occupies a position of intermediate importance between the two. As the lobby of all the cranial nerves it has great sensory import, but its chief interest lies downwards in relation to the spine, and not upwards towards the basal ganglia of the brain.

There is one more cerebral organ to be mentioned in passing, the corpus striatum, because it lies in some undetermined fashion on the way from the thalamic region to the upper brain. If it plays a part in their reciprocal functions and communications, its influence is unknown. In experiments with decerebrate animals it is not yet determined how far the loss of the corpus striatum may be said to have decisive results on the course of their behaviour. There are none of the remarkable variations of habit comparable to those which occur with the loss of the thalamus. What is most puzzling about the corpus striatum is, that while there are many fibres passing from the thalamus to the corpus striatum, there seem to be very few fibres passing onwards thence to the cortex.

We have now arrived at the vexed question of the methods of communication between the thalamus and the cortex; but before entering on it, I should like to repeat what I have said before as to the necessary limitation of the exact questions to be examined. Just as I have had to neglect reflexes and everything in the spinal nervous system below the bulb, so also I must leave out of consideration all the area of the cortex itself. The localization of function in the brain has gone a long way since it was opened up by Gall, but it is far from fixed in detail. Yet we may, I think, take for granted Sir Charles Sherrington's designation of the motor centres and assume as a prime fact, for example, the accepted view that olfactory sensations pass to the uncus and hippocampus in the cerebral hemispheres. For the rest I regard the convolutions of the upper brain as two related firmaments, crossed by

30 to 40,000 association fibres and heaven knows how many wireless messages. For me they constitute a single homogeneous inverted bowl, into which and from which glide in and out the communications with which the thalamic region is identified as sender or recipient. From the point of view of the mechanism of intelligence, whether instinct, intellect or intuition, I am only concerned here with the mysteries of the basal ganglia of the brain.

The immense interest of the thalamic region, embracing organs of descending degrees of importance, as they radiate downwards and outwards from the pineal body and the medial nucleus of the old thalamus, lies in the fact that it enhances two functions: the undeniable and comprehensive office of collecting, distributing and to an unknown extent influencing all sensations, except those of smell; the summation of a certain problematic identity of the self, probably amounting to a degree of consciousness not yet defined and possibly extending to a height of independence hitherto unsuspected. As to its independence, in claiming that the end-organ situated within the thalamus is the seat of the instinctive faculty with capacity for feeling and thought, I am going beyond my mentors; as to its realization of consciousness there is already a growing amount of support.

'Thus we believe', say Head and Holmes, 'that the essential organ of the optic thalamus is the centre of consciousness for certain elements of sensation. It responds to all stimuli capable of evoking either pleasure and discomfort or consciousness of a change of state. The feeling-tone of somatic or visceral sensation is the product of thalamic activity and the fact that a sensation is devoid of feeling-tone shows that the impulses, which underlie its production, make no thalamic appeal.' [1]

'Even in man', writes Dr. Herrick, 'the thalamic and visceral mechanisms of affective experience are preserved and give a characteristic organic background to the entire conscious life'. [2]

There is a not unreasonable temptation to put these two conceptions together and to concede to the thalamic organ at least what Sir John Parsons would call 'consciousness on the plane of instinct'.[3] The primitive form of consciousness he would call awareness to the extent of attention, leading on by further differentiation and integration to interest. A further stage would appear with the awakening of the elements of feeling. 'The corresponding integration of affective tones emerges in emotion. This gives rise, by conation, to an integrated motor activity, which, by backstroke, contributes to the emotional affective tone. This is consciousness on the plane of instinct.'

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[1] *Studies in Neurology*, Vol. II, Pt. IV, 'The Brain,' p. 601.

[2] *Introduction to Neurology*, p. 289.

[3] *Perception*, p. 6.

Such a degree of consciousness, if no more, I have no hesitation in attributing to the thalamus and it will not be long before this degree will be a matter of general admission. Whether time will show that something further may be predicated and that consciousness on the plane of higher intelligence may also be granted, is a matter of far deeper argument and perhaps of more subtle discrimination.

The details of location, on which so much turns in giving us ground for legitimate inferences, still leave a wide field for future research and determination. Our joint authors say elsewhere: 'We know that all afferent fibres passing upwards from the midbrain end in the optic thalamus. Here lie the synaptic junctions of those paths by which impulses are carried to the cortex; no path passes upwards without undergoing a relay in some point of this organ. . . . It is obvious that, if all afferent impulses undergo a relay in the optic thalamus, a lesion at a point where they enter this organ may interrupt them before they have done regrouping: they may be cut off before they have reached the thalamic junction and the loss of sensation would then correspond to that produced by a lesion of the mid-brain, although the disease might lie in the optic thalamus.'

'On the other hand, sensory impulses may reach the optic thalamus undisturbed and undergo characteristic changes in grouping; but the fibres which conduct them from the thalamus to the cortex may be interrupted by the lesion. Finally, since lesions of the optic thalamus are usually of vascular (circulatory) origin and tend to disturb anatomical areas rather than functional paths, they not infrequently interfere both with the impulses which enter the thalamus and with those which pass away from this organ to the cortex.' [1]

It will perhaps be allowed, as a sufficient justification for quoting so long a passage, if I point out that I need to emphasize all the difficulties that lie in the way of making any inferences about in- and out-going impulses to the thalamus. Even so I have not exhausted the obstacles to accurate reasoning in this quarter. Both Parsons and Head use most frequently the warning that any interruption or modification of the stream of impulses may not only be due to accident on the way in or on the way out, but owing to 'backstroke from the cortex'. The closeness of all these paths and the minuteness of the junctions and synapses render the areas of movement and change liable to perpetual interference from many causes, among which cortical control is the chief awkward unknown factor. A sensory impulse may arrive safely in the thalamus and leave it safely by a thalamo-cortical fibre; yet back may come an instantaneous message along a cortico-thalamic fibre restraining the tide of similar impulses, exaggerating them or inhibiting them altogether. Such is the meaning of the phrase 'by backstroke from the cortex'.

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[1] Head and Holmes, *Studies in Neurology*, Pt. II, p. 551.

What happens clumsily in sensation may happen a million times a day in delicate shades of emotion and thought, by way of control or suggestion upwards and downwards, from instinct to reason or from reason and intuition in modification of crude instinct.

The mechanism of communication must necessarily be duplicate; some fibres leading from thalamic cells upward, other fibres conducting from cortical cells downward. There cannot be, or at any rate there are not, any common paths for both-way traffic. In consequence the search for exact ways of communication becomes intensely interesting. We know that in peculiar cases the shouting is all one way. Some mysterious localities, like the small-celled section (*c*) of the medial nucleus of the thalamus, are dumb to everything. The latter must, so to speak, suffer in silence. If any sub-audible groan occurs, it will only be heard as a whisper by its neighbour, the pineal body.

As to the fibres passing from the thalamus to the cortex, some appear to be traceable from various nuclei for touch, hearing and especially sight, as already noted and roughly indicated in Fig. II. The bulk of the thalamo-cortical fibres pass through the latticed layer or outer edge of the lateral nucleus. They combine in four groups or stalks for separate destinations in the cortex. The anterior stalk passes to the frontal lobe of the brain. The posterior stalk carrying optic radiations goes to the occipital lobe; the inferior stalk to the island of Reil and the temporal lobe; the outer stalk to the parietal lobe. A moderate number of fibres pass to the corpus striatum, from which fewer still pass on to the cortex.

Similarly nearly all the returning cortico-thalamic fibres arrive in the latticed layer, where their impulses are merged in the central general exchange round the intercalated cell and some undoubtedly pass back along the short stalk of fibres, shown in Figs. I and II, leading into the end-organ of section (*b*) of the medial thalamus. All the secrets of protopathic and epicritic sensibility, the crude and refined impulses of sensation travel by that obscure path which holds the secret of the human conscious self. How many of them are feelings and how few of them are thoughts? Is it on this shore in the darkness that the waves break during an emotional storm?

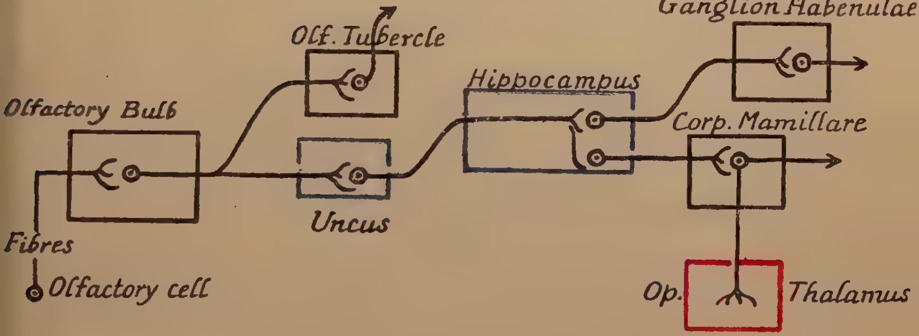
To this general monopoly in section (*b*) of the medial thalamus of the returning fibres, there seem to be only two exceptions and one of them offers an intriguing problem. The first is the tectum or superior corpus quadrigeminum, the busiest centre of crude animal incoming impulses. In that centre there is no known path to the higher brain, except the general high road through the thalamic exchange. But the tectum receives messages direct from the cortex; it is like a subordinate's room in an office, where the telephone is arranged to work only one way.

The second exception is even more suggestive of mystery. It affects the inner recess of the so-called VIIIth cranial nerve, which consists in reality of two intertwined separate stalks of fibres, carrying respectively the auditory and vestibular messages from the outer and inner ears to the inner or medial geniculate body. Now as far as we know this small organ is the sole portion of the body which has the double privilege of communicating both ways with the cortex, except the latticed layer, which is a mere lobby.

I must confess to a weakness for imagining a hidden meaning to strange exceptional situations, such as that of the centre for hearing, balance and probably rhythm having the special, and as far as we know unique, privilege of private access both ways to the higher seat of intelligence. Just as it has been suggested, I think by Sir Victor Horsley, that sea-sickness is due to the close proximity of the VIIIth, auditory and vestibular, cranial nerve to the Xth, vagus or pneumo-gastric, cranial nerve, which controls the stomach, so do I connect the emotional power of harmony and rhythm with the special privileges of the inner geniculate body. Suppose it were true that through this odd little organ we received our most intimate impression of time, linking all external beats and periods with our own circulatory and visceral pulsations? Should we not need for this purpose the help of exquisite epicritic sensibility to interpret for us a standard more stable and more subtle than one measured by great thumps of the heart or fluctuating rushes of the blood?

A far deeper problem surrounds the extent of the function performed by the central mechanism for relaying sensation, concen-

FIGURE IV. A DIAGRAM OF THE
PATH OF THE IMPULSES OF SMELL



🟦 indicates the gyri or cortical convolutions
🟥 indicates the sole thalamic projection

(Details taken from Paton, 1920)

trated as Sir Henry Head suggests in the intercalated cell. The intercalated cell as described by Head and shown in Figs. I and II, appears at present rather as a symbol than an actuality, since so little is known of its functions. It stands for a small group of working cells, which represent the great junction of the vast mass of our sensory impulses. Here in the ventral nucleus of the thalamus there arrive two streams of sensibility: the somatic messages from the whole body, which come up the lemniscus or fillet; and those from the distance receptors of the special senses of sight and hearing, as well as messages from the semi-somatic senses of taste and facial touch. Smell is the only exception.

On the outgoing side of the junction two streams also pass away: primarily, a stalk of fibres ingoing to the end-organ of section (*b*) of the medial nucleus of the thalamus; and secondarily, the stalk or stalks of fibres passing into the lateral nucleus, thence through the latticed layer or fringed edge into the outer channel called the internal capsule and finally to the convolutions of the cortex of the cerebral hemispheres.

As to the functions of the intercalated cell and what these functions import, there are three alternative possibilities, equally tenable as far as our present ignorance goes, which will be examined during the course of the two following chapters. The problem is broadly to account for the possibility or probability of some form of selection being accomplished in the great exchange of impulses which crowd in to the thalamic junction from minute to minute in the central human organism.

It may seem unjustifiable at the outset to rule out mere chance; it is possible that there is, as suggested in Halliburton's *Textbook of Physiology*,[1] 'a struggle for dominance'. But is it not still more difficult to suppose that two streams of sensation can be steadily poured through a narrow channel, pounding day and night, so to speak, over two weirs, with the result of a division so perfect as that which we can see for ourselves in our delicately regulated systems of sensibility?

If there is no chance settlement, nor fight for superiority, where can we place the organizing intelligence? Is the responsibility to be referred to the peripheral nerves themselves for self-election, as to whether their messages shall go to the higher or lower system? Or are we to look for the call of the distant cortex? Or is there a rougher and stronger selecting authority in the neighbouring instinctive intelligence?

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[1] P. 744.

For the moment I lay an emphatic stress on the problem of the intercalated cell on account of the midway position it occupies in the argument of the present work. The problem not only anticipates the difficulties involved in redistribution of sensations, which have yet to be discussed. It has also a very material relation to the power and capacity of the instinctive faculty, which I have presumed to lie in the central section of the medial nucleus of the thalamus.

If there is any discretion exercised in the separation of impulses into two streams of protopathic and epicritic sensibility, the argument from body to mind tends to show that the power of choice lies either in the cortex with its suitable cells in the grey matter, associated with our conception of conscious intelligence, or else with that far smaller but precisely parallel equipment of cells or grey matter existing in the end-organ of the thalamus.

In the former case it must be either intellect or unconscious intuition which renders these weighty decisions. In the latter case it would be the intelligent factor of instinct, acting extra-consciously, which keeps the vital crude sensations and sends more delicate and refined issues to the brain for further discrimination.

On reviewing the same problem from the point of view of introspection it appears clearly unlikely, nay almost certainly impossible, that any choice is exercised in this province by the conscious faculty of reason. We may therefore entertain a psychological presumption that the active agency should be attributed either to the faculty of intuition or to that of instinct acting extra-consciously. It seems improbable that the presumptive case from introspection will ever become stronger than it is at present. Any steps towards certainty must be hoped for, if not expected, from the side of an advance in our physiological knowledge. In this direction a good deal of progress has already been made and made recently, so that we need not apprehend an absolute finality in impotence or in indecision.

There are a few more words to be said on one aspect of our illustrations in showing a curtailed and sketchy indication of our central motor system and its original physiological and psychological source. The subject would be outside our physical limits of discussion, as it hardly touches the area of the basal ganglia of the brain, if it were not necessary at least to show that the so-called voluntary motor origins do lie outside our purview and that the mental duality between the instinctive and intellectual-intuitive faculties do not bring about an alternative or divided command in action. All central motor orders spring undeniably from the cortex in regions roughly indicated in Fig. I, by labels for different organs in accordance with the information given by Foster and Sherrington's *Physiology*.

There is general agreement as to the location of the chief motor area in the convolutions of the cortex. The nerve cells in which motor impulses arise are of a peculiar large type called giant pyramid cells, which give the name of 'pyramidal tract' to the stalk or bundle of fibres passing down the internal capsule to the spinal cord.

The psychological interest of the motor system evaporates for us, when once the motor nerves have been set in operation. Our present subject covers only the approach to the determination of the self by the will, to the elimination of the preliminary duality and to the unifying of the single personality by the sole and inescapable process of action.

The growth of the personality must follow a certain order during the course of its emergence. Unity and continuity of mind must be achieved by the reconciliation of the instinctive faculty with the joint cerebral faculties of reason and intuition. The elements of will appear as the first result and the will proper can be established by a certain minimum continuity, which becomes in time what we call habit. The triumphant assertion of the personality in full will-power is shown in the stability of motive and the continuity of conduct. Any signs of vacillation can be generally traced back to the weaknesses engendered by the original duality.

CHAPTER XVIII

DUAL SYSTEM OF SENSIBILITY

A SUBJECT like the dual system of Protopathic and Epicritic Sensibility deserves a closer description than can be given of it in the present chapter. The renunciation of the task necessarily follows from several causes, each of them imposing valid obstacles to more lengthy treatment. In principle the issue is settled by the work of Sir Henry Head and Sir John Parsons, but much requires to be worked out in detail before I or any other layman can understand it fully. There are many points of interpretation in which a psychologist may think he has a right to his own opinion, when perhaps further and closer research would prove him in the end to have been rather rash. The chief reason of all is that any abstract of the work already done will probably not only be inaccurate, but do injustice to the original researches by discouraging some busy enquirer from following up the full account in the original sources.

The evidence is to be found in two bodies of work. Head and Rivers between them have published joint and separate accounts of the original researches, which gave rise to the important generalization that we have two, if not three separate systems of sensibility. The joint account, which is quite separate from Head's work on the thalamus, is to be found in *Studies in Neurology* (1920). Rivers' separate comments appear in his *Instinct and the Unconscious* (1922), a later work, where he came to link up protopathic sensibility and its 'all or none' principle with human instinctive origins. In his own book Rivers felt free to elaborate his private views in a direction which Dr. C. S. Myers seemed to think was not necessarily his final opinion. Myers has given a valuable abstract of the Head experiments in his textbook of *Experimental Psychology* (1911). Other medical workers such as Boring, Davies, Piéron and Trotter have commented on or gone over the same ground, but they do not all follow the same line of argument.

Finally, Sir John Parsons has picked up the series of experiments and the argument at very much the point where they were left by the original operators. I gather that with certain minor differences his views are the same as those of Head and Rivers, so far as the latter agree together. He has, however, carried the whole investigation on to new ground and re-created the argument afresh by the new light thrown on it in his investigations in comparative anatomy. His elaboration of its main principles in the immensely detailed intricacies of our most refined projicient sense constitute a refoundation as well as a confirmation of the original hypothesis. He writes that: 'Head's distinction of protopathic and epicritic systems is fundamentally correct, in spite of grave difficulties and inconsistencies in detail.' [1]

Sir John's work on the dual sensibility in man overlaps his other work on the thalamic region, already so often quoted by me, but embodies a wholly different argument from my point of view in psychology. Sir John has investigated the thalamic region and the instinctive faculty as being a part of the dual systems of sensation in order the better to appreciate their bearings on the double mechanism of sight, which he recognizes as governing space-perception in the first instance and as illustrating the difference between rod and cone vision in the second. From the point of view of psychology the question of duality in sensation has even more far-reaching consequences and I am inclined to invert the argument and reason upwards from evidences of dual sensation to the broader question of an original duality in the forms and seats of intelligence.

For the same reason I prefer to hark back to the older use of terms adopted by Head. The newer qualifications applied to the delicate shades of perception and vision, such as dyscritic, epicritic and syncritic, do not sufficiently emphasize for me the basic distinction between two sets of upper and lower gradations so well as protopathic and epicritic. There may well be, as Head writes, a deeper element in sensation than protopathic and something still more discriminating than epicritic, as Sir John would hold, but I wish at present to confine myself strictly to the notion of duality.

The original researches, when the late Dr. Rivers was the observer and Dr. Head, as he then was, was the subject, were directed to cutaneous sensation and carried out from 1903–8. They tended to show three systems of sensibility:

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[1] *An Introduction to the Theory of Perception*, p. 65. See also the broader treatment of the whole question in Chapters V, VII and VIII of the same work.

(1) Deep sensibility, carried by afferent nerves along fibres in muscles and tendons, associated with the muscle sense. (2) Protopathic sensibility, recording diffused and often exaggerated sensations in response to cutaneous stimuli. (3) Epicritic sensibility, to whose impulses we owe the power of cutaneous localization and of discrimination between narrower grades of temperature.[1]

The tendency is growing to concentrate attention on a double nervous system and to disregard deep sensibility as being mainly psychological in character. The latter is, in fact, what I have called in an earlier chapter on the consideration of pain and pleasure 'structural alarm' and is especially elicited by heavy pressure on bone, thus arousing combined and compound reactions from the whole framework of the body.

The characteristics of protopathic sensibility are that it is primitive in its manifestations and phylogenetically old in its origin. Its perceptive capacity is restricted to sensations, which may be interpreted as being of vital import. Its reactions are assimilated to those of 'mass reflex', where one special type of sensation in any single fibre calls in the help of surrounding nerve fibres to produce a multiple reaction of a vague but formidable kind. They are like a small crowd of small people shouting together for fear that a single voice would not be heard. Finally, the responses given in protopathic sensation are of the 'all or none' variety; they are not easily elicited; they are apt to be explosive in their expression; and either they fail to act or they have a tendency to overdo it. In this stage there is little differentiation and little discrimination.[2]

Epicritic sensation, on the other hand, takes less account of what we call broadly 'feelings' and specializes particularly in the business of what are substantially 'perceptions' with the beginnings of the cognitive element. The refined sensations are the work of a wholly different process from that of the crude variety, whether regarded physiologically from the 'body to mind' point of view or psychologically from the 'mind to body' method of study.

In the late and epicritic stage of sensation, which is also the early stage of perception, we can distinguish accurate details for ourselves, not only because our awareness has been deepened into interest, but because our bodily apparatus in the special senses offers us a wholly different set of facts for purposes of dis-

[1] Head and Rivers, *passim*.

[2] Parsons, *Perception*, p. 44 and elsewhere.

crimination. It would perhaps be better to say that the same set of original facts is offered us twice over in two slightly differing series, one overlapping and overlying the other. The first is widely spaced. If we depended on it alone, we should have definite but rough sketches of events. In the second presentation, second that is to say in logic, but not in time, for the two presentations are simultaneous, an intervening series of facts is offered to fill up the gaps left in the first series.

We can picture the difference by imagining how hard it is to time a hundred yards' race with an ordinary seconds-dial watch, as compared with using a stop-watch. But we must go further and imagine a single observer timing a race with two watches at the same time. How is it possible, we may well ask, for us to observe two series of facts continuously in any perception lasting over five or six seconds? Is it not because we do not depend on a single observer in ourselves? Is not one observation taken up in detail by a single faculty, while a second faculty assembles a continuous series of relations?

It would be natural to find, as we do find, indications of protopathic sensibility and examples of protopathic mechanism running through all the lowly forms of life. With the gradual progress of active organisms to the higher stages of structure in vertebrates and mammals there is a steady development of the apparatus for epicritic differentiation and discrimination. Naturally enough the available information for these degrees of phylogenetic advance confirms a close relation between early sensation and instinctive intelligence. 'It is probable that primitive instincts are all primarily protopathic and that the epicritic differentiation is rather of the nature of a response due to intelligence. Hence the difficulty experienced in drawing a sharp line between instinct and intelligence.'[1]

The painstaking and convincing way in which primitive protopathic sensory equipment is identified by Parsons with the Edinger fibre system and its early history through pre-vertebrate animals is more than a substantial contribution to psychology as well as to physiology.[2] Without it the whole theory of dual sensibility would be hung up in the air. Without it the study of the mind would lack its much-needed connecting link with comparative anatomy and the primitive origins of its own evolution. I feel sure that, as the late Dr. Rivers was eminently justified in repeating, the key to the history of instinct and the classification of its primitive forms is wrapped up in tracing the development of the protopathic system of sensibility.

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[1] *Perception*, p. 175.

[2] *Ibid.*, pp. 68, 75, 80, 132, 231.

The Head-Rivers experiments in cutaneous sensation consisted in selecting an area of skin, where the nerves were artificially severed and the results in sensation compared with normal experiences. The interrupted paths did not prevent the feeling by the subject of heat, cold and pressure, but gave results, such as those described above, as protopathic. It has been found that this residuary form of sensation, which is also primitive, is conveyed by a wholly separate system of fibres identified with the name of Edinger, since they were first described by him. They are clearly recognized in most vertebrates. According to Head and Thompson this elementary system in man conducts pain and temperature and perhaps tactile sensations. Their paths assemble in the mid-brain, particularly in those points which are called the corpus posticum and tectum opticum, whence they pass to the ventral nucleus of the thalamus.[1] So far as we know they have thence no cortical projection, or in other words they are not carried to the higher brain by any special mechanism.

Sensations in the healthy skin are conveyed much more accurately than by the protopathic method in the disabled area. The more perfect and normal method gives careful gradations both locally and in intensity. For that reason they have been called epicritic. All the refinements of epicritic sensation are credited to the greater powers of discrimination of the cortex.

The vehicle of epicritic sensations consists of a separate system of fibre-stalks from the Edinger organization. In the case of the special senses they follow individual tracks to various nuclei of the thalamus, as we shall see in the next few pages. In the case of skin-sensibility they are conveyed by the median fillet to the ventral nucleus of the thalamus, where they are credited by Parsons with a cortical projection.[2] Some of the epicritic fibres are supposed to reach the medial nucleus of the thalamus. But the latter point is a matter of conjecture and the particular section (*a*, *b*, or *c*) is not specified.

So much for sensations, mainly somatic, where the inferences are drawn from a slender thread of human experiment and from wide anatomical investigations both in animals and men. Placed side by side with the accumulated evidence of structure, mentioned in earlier chapters, they confirm the well-grounded hypothesis that the thalamic region is the great exchange and relaying

[1] *Perception*, pp. 69, 80–1, 132–3.

[2] *Ibid.*, pp. 133–4.

centre for sensations of all kinds. It may be said that the further evidence, obtained by Head and Holmes from war injuries in and near the thalamus, showed very often the destruction of all epicritic sensation in certain cases and the substitution for it of protopathic reactions in a manner quite parallel to the results exhibited in the personal injuries inflicted by Head on himself with the control of Rivers and subsequently confirmed by other investigators.

To this body of ascertained knowledge, insufficient as it is to establish more than a presumptive case as to the actual methods of transmission of sensation beyond and above the thalamic region, may be added a body of corroborative evidence, accompanied by close reasoning, drawn by Sir John Parsons from his special study of vision. The mechanism of the eye and of the adjusting muscular movements of eyeballs and eyelids, including also the careful correlating movements of hand and body to eye through the pulvinar, constitute a system of massed co-ordinated parallel performances perhaps unequalled in the human frame or indeed elsewhere. A great deal is fortunately known about them.

It would be well therefore for anyone prosecuting the present study to examine for themselves the argument advanced by Sir John for considering as a protopathic sensation-perception process the arrangement of achromatic scotopic vision in a half-light, with its primitive rod apparatus compared with the chromatic photopic vision in sunlight, with its epicritic discrimination by means of the cone mechanism.[1] As a matter of logical exposition the reasoning has my immense admiration. The parallelism between dual vision in man and the protopathic-epicritic opposition in sensation is worthy of close attention.

Less conclusive, in my opinion, although I personally agree with its reasoning, is a similar parallel offered in the process of space-perception, which is based more on its origin and phylogenetic development than on existing mechanism. 'The primitive form of space-perception is clearly the older and the less differentiated. The definitive form is the younger, more highly differentiated, more complex and more comprehensive.'[2] The dual set of facts are undeniable, but whether we may connect up this manifestation of duality with the more central form of duality I am not quite clear. Space-perception may be at a point of arrested progress, where one stage of development overlaps the other, or it may be that we at present need each of two systems for definite purposes and therefore retain the simultaneous use of both.

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[1] *Perception*, pp. 176 and 181.

[2] *Ibid.*, p. 160.

Whenever there is present in the construction, in the development and in the operation of an organism, a fundamental duality, a duality founded on a dual principle and exemplified in separate dualities in detail, there is a temptation to link up the outlying demonstrable instances of duality too soon, thereby injuring our prospects of fully comprehending the central combining principle. That is probably the position in which we stand with regard to the principle of mental duality. We are aware of a mental duality with minor complications resembling it. We have ample evidence of dual mechanism corresponding with dual mentality, concentrated in two centres, the thalamic region and the cerebral cortex. To understand our own organization in sensation and for all purposes of sensibility must be enough for the moment and on these broad lines we can rest content that there is enough to occupy us for some time. Duality there is; most probably it is organic and certainly it is deep-seated.

Speaking for the whole group of the near relations of man, Parsons sums up very well our immediate achievements. 'Our knowledge of the extero-ceptive impulses in mammals is much greater than in other classes of animals, owing chiefly to the researches of Head and Rivers and their fellow-workers. The fundamental duality of the sensory impulses, discovered by Head and Rivers and named protopathic and epicritic by them, is borne out, not only by their physiological researches but also by the anatomical facts already discussed.' [1]

Weighing up the whole case for reconstructing unity out of duality in mental and semi-mental events, both in and out of consciousness, it is certain that our chief problem will arise in interpreting the relations between the two centres. We have evidence of independence of a kind in each centre with varying degrees of completeness. We know that there is relative autonomy in sensation; we feel a great probability in supposing that there is some degree of consciousness in each centre; we have slender reasons to believe that intelligence is possibly to be attributed separately to the core of the thalamic region as well as to the cortex. The diversity begins with the simplest elements of sensation: feeling, touch and pain, and perceiving with vision. The unity comes in at the end in the final necessity of common purpose before action through the voluntary motor system.

The problem of communications is the crucial problem. It is not only the simple one of ascertaining how the thalamus impresses the cortex and how the brain acts by backstroke on the lower region. It is that and something else. There are fibres leading both ways to show us the paths. The problem is more profound and divides itself into two chief enquiries, with perhaps an odd subsidiary question or two. How does the selection of the two streams of sensation, which pass from one to the other, take effect, not as a matter of physical division but on what principle of assignment and under what system of control? Having ascertained the method of procedure, can we by phylogenetic interpretation determine why the process, as it exists at present, should be so complicated and whether we are to consider it stable?

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[1] *Perception*, pp. 131–2.

The present answers to both these questions are very insufficient. Indeed it is possible that no future generation can really answer the second in the affirmative, as thoughtlessly most of us might be inclined to do. To attempt to reply to the first is by no means a simple task. To begin with, we are left without any conclusive anatomical evidence. Man in respect of his intellect is very different from any of the animals, especially in his power of self-knowledge. Physically his cortex is not to any extent subject to experiment and our ignorance of its convolutions, as well as of all its associated bodies is likely to last for some time. Of the most important of them our knowledge is accidental, sketchy and indirectly inferential.

We are aware that the sensory paths of assembly lead to various parts of the thalamus, concentrating chiefly in the ventral nucleus. The majority of the outward and upward paths lie through the latticed layer in generous confusion and no light is thrown on what goes up to the cortex, except by inference from the functions of either their origins or their destinations.

Pain and noci-ceptive impulses pass to sections of the thalamus which have no cortical projection and we presume that their powerful effects take place in the lower region. Further, we suppose that they belong to a vital class of sensations, which are selected out beforehand in our evolutionary history with or without instinctive initiative. We call them protopathic as a group, but we are ignorant how far they are modified by epicritic discriminations returning by backstroke from the cortex.

Our greatest authority, Sir Henry Head, takes this view from his experience of injuries near to the thalamus, caused either in the latticed layer or to the returning cortico-thalamic fibres. 'The excessive response to affective stimuli, so prominent a feature of lesions in this situation (the lateral part of the thalamus), is not due to irritation but to removal of cortical control.'[1] M. Henri Piéron, while not accepting Head's results in detail, seems to concede that there is considerable independence with the thalamus in affective matters, while the cortex has a function of discrimination only.[2] But he throws no light on the chief point of our difficulty as to communications between the thalamus and the cortex, so that we may take what he says as merely a pious opinion.

Important as these views are, they do not touch the area of our greatest perplexity, which lies in our uncertainty as to the amount and quality of sensation that goes up in the first place from the thalamus to the cortex. How can the cortex modify by backstroke that which it has never originally received? We are faced with the alternative of believing, either that everything in sensation goes in some form to the cortex for its consideration and for possible modification, or else that some principle of selection is exercised somewhere, whereby only delicate matters are forwarded up for attention and discrimination, while the crude material, which includes all vital sensations, is dealt with responsibly or irresponsibly below.

This conundrum has been indicated before, early in Chapter X, and has awaited a solution until after our mental mechanism had been examined. Only one certain result has so far appeared and that is that all sensation arrives primarily in the thalamus region with the exception of the case of smell. We cannot in reason conclude that all sensation is thence relayed at once to the cortex. There is no argument in favour of that view and much evidence which leads us to conclude the contrary. There is finally the known existence of another end-organ for sensation.

On the present evidence the conclusion is unavoidable that the operation of division as well as relaying must occur somewhere in the ventral nucleus of the thalamus or possibly on the edge of the lateral nucleus. That it is more than a mechanical task may be inferred from the fact that it is extremely difficult to place the selection of sensation elsewhere than at the same point as the relaying process. No other time or locality can be suggested as a valid alternative. The few possible solutions already mentioned at the end of the last chapter come up again for review. Either there is no selection at all, but a 'blooming buzzing confusion' with a struggle for dominance in a kind of happy Hampstead holiday; or just three other possibilities remain.

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[1] *Studies in Neurology*, Vol. II, p. 597.

[2] *Le Cerveau et la Pensée*, p. 121.

[3] An expressive phrase of William James, which Sir John Parsons is fond of quoting.

If there be a selection, which the reasonable and infallible continuity of sensation certainly gives us the right to suppose, it must take place either above the junction or below the junction or in the junction itself. Against the suggestion of selection in the cortex we have the reasons given above, that direct cortical selection is possible only if everything is automatically relayed upwards and that some of the items are returned. Against the selection below-stairs we have the difficulty of phylogenetic interpretation arising at once. How about the sense of smell? If one section had been reserved for the cortex by its evolutionary utility in that position, why should all our other sensations be crowded below into thalamic channels? Clearly vital utility is the prime necessity drawing all sensation, except smell, to the point where it can be judged and must be selected for separation into two streams, the protopathic and epicritic. A central form of intelligence, existing, working and selecting at the point of junction and of division, is the most reasonable hypothesis to account for the known facts. We have the presumption of that intelligence present in the instinctive faculty, whose seat is inferentially in the central section of the medial nucleus of the thalamus.

Intervention at the point of the thalamic relaying-junction of sensation is too easy an explanation to be accepted without some close investigation of the manner in which the intervening power and/or intelligence puts its discretionary function into operation. It will, I trust, be possible to make it clear that such a method of choice and revision, the institution, in fact, of a kind of presidency over the process of division of the course of sensibility into two streams, does not imply a series of momentary judgments by a present and perpetually intervening authority. All that we know of the instinctive intelligence implies an exactly contrary opinion. Wherever the instinctive faculty acts outside consciousness, it seems to act indirectly through carefully prepared instruments, instruments forged for it in the course of evolutionary exigencies. Instinctive relations with the brain furnish the best case in point. Instinctive operation suggests a great energy used with a certain deliberative decision, an intelligent timidity, which is slow in resorting to effective interference, but applies it on occasion crushingly and finally without hesitation.

Let us examine the machinery whereby the instinctive or thalamic intelligence would naturally act in controlling the course of sensibility. It is primarily essential to state that there are serious objections to the theory of central control of sensibility of any kind, such as I have suggested, and that they come from very great authority. Sir Henry Head, for instance, seems to be of opinion that direct cortical inhibition of over-emphatic protopathic sensibility is continually in operation. Cortical control may be destroyed, he suggests in the passage quoted above, by thalamic lesion in the lateral nucleus or it may be impaired by injury to cortico-thalamic fibres. This view does not coincide with and practically rules out one of my alternatives named, where all sensations would go up to the cortex and some be selected for retention, the others being returned. The hypothesis of control by backstroke seems at first sight sounder, but does it not imply a detailed knowledge by the cortex of sensory messages which the cortex has never received? How can the double forms of sensation be known to the cortical intelligence? Would not such a system of continuous supervision require an elaborate machinery of universal backstroke control over protopathic sensibility, for the existence of which we have no fragment of evidence?

Dr. Rivers's view makes concessions to the theory of backstroke control but does not essentially adopt it. In an important passage he indicates his belief in a more powerful inhibitory influence than cortical interference. 'When the cortex is in action the affective over-response of the thalamus is largely suppressed under ordinary conditions, but the process of suppression does not come out so strongly as in the case of the peripheral nervous system, because some of the primitive features, which most need suppression, have already undergone this fate.' [1]

On the face of it the reading of this passage seems to suggest a dual system of control for sensibility; upper control by backstroke and below-stairs control from the periphery. In reality, according to Rivers, the substantial control would be exerted and is being exerted by inhibition of ordinary protopathic sensibility at the periphery. Occasional interference with sensibility by backstroke is allowed but is not essential.

It seems to me not unfair to say that we have here Rivers in substantial opposition to Head, because the critical difficulty in the broad interpretation of sensation is to understand how the partial but perpetual inhibition of protopathic sensibility is maintained in normal life so that the finer epicritic system shall have full play. Any occasional interposition of backstroke is a circumstance of minor importance.

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[1] *Instinct and the Unconscious*, pp. 27–8.

Under this cloud of perplexity it seems to me not unreasonable to suggest that local inhibition of the all-embracing, but not usually operating, protopathic demonstrations of the 'mass-reflex' and 'all-or-none' variety of responses to ordinary stimuli might occur, as Rivers suggests, at the periphery where surface injuries occur. Local inhibition would include a certain amount of selection. It does not, however, necessarily follow that independent power of choice lies in any local centre of sensation in the periphery. That is improbable to the degree of being almost impossible.

Subordinate control under central direction carried out on a system is what the selective instinctive intelligence no doubt imposes, as we shall see from the cases of convalescence described below and analysed by Rivers himself. The nature of control exercised over a certain kind of crude sensation takes the form of a general provisional inhibition, which can be suspended in case of need. Cases of need arise whenever the cortical epicritic system of sensation is interrupted by lesion or even by some temporary cause.

The probability of this interpretation is enhanced when we remember that the thalamus is or contains the end-organ for protopathic sensibility. If the thalamo-instinctive intelligence is concentrated in the medial nucleus, its power to inhibit its own protopathic system as a steady and necessary feature of normal life is not difficult to understand. The chief question, which remains uncertain, is as to where the actual inhibition, centrally commanded, is exercised, whether in the thalamic junction or locally at the periphery. It presumably lies in one or the other with a slight accent of probability on the second. There would be far greater difficulties in maintaining the contention that the cortex reacts back on the thalamic system with a perpetual inhibition on all protopathic sensation. It is not even proved that backstroke action is prevalent as a matter of experience, though no one would deny its possibility.

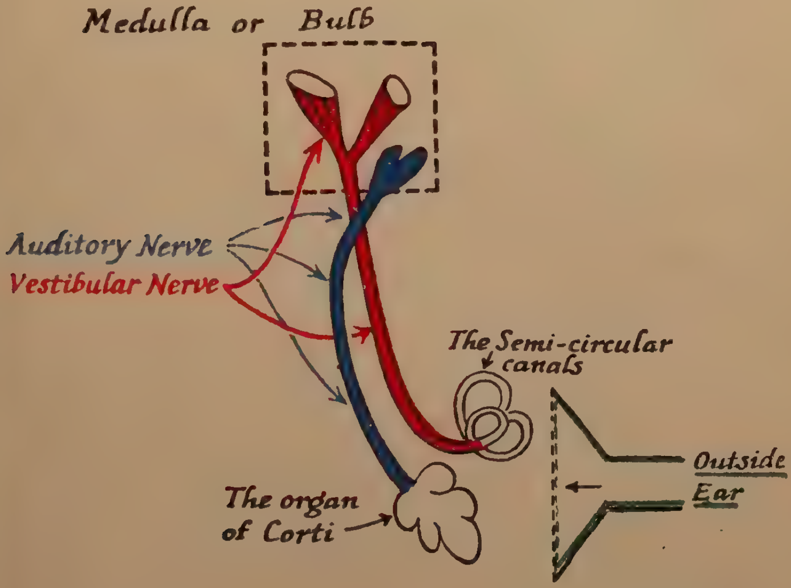
Of the two broad questions outlined above, the second, as to the phylogenetic interpretation of our human sensory organization, needs a brief consideration. There is no virtual certainty that our present development is more than a compromise between two systems, which are undoubtedly working together within us on some unknown terms of co-ordination. We may well be in a half-way stage to something more perfect. Our problem might be equally well expressed in other words. Is the protopathic system inferior to the epicritic? We can hardly say so in a vital sense. In the evolutionary sense the former has been superseded in man for many purposes by the latter, but the stronger system is still held in reserve and is brought in on occasion. It is more convenient and serviceable that vital sensibility should be held in suspense and that the more fastidious system should overlay the other.

We have yet to consider an unknown but possible thalamic control over all cortical sensation to the extent of having all the relay work operating in the ventral nucleus of the thalamus with contingent influence on possible selection. If there are large quantities of doubtful items passing through the area of division of impulses, where is it that some almost unescapable duties of choice must be exercised? From the point of view of economy of effort and of efficiency, would it more conveniently occur at the relaying junction or would it be more remotely operated at the further terminus? This perplexing question will be discussed in the next chapter.

The proof that choice is exercised by any form of intelligence is not absolute, but there are circumstances which point to the use of discretion and even of judgment in blending two different forms of sensibility. The two systems of sensibility exist side by side and work continually, both independently and in co-operation, as for instance in the case of ordinary light and dark vision and possibly in a specially delicate way in space-perception. In cutaneous sensation we can find most interesting confirmation of co-operation in special exigencies by turning back a few pages in *Instinct and the Unconscious*. After describing the course of interruption of normal sensibility, wherein the protopathic element is held in abeyance at first and released owing to division of a sensory nerve, Rivers discusses the gradual return to the normal state. Until the severed nerve is completely healed, a pathological condition continues and only passes away by degrees, during which period the primitive form of sensibility undergoes modifications. Normality is not restored at once but definite stages of change appear in the course of the continuing protopathic sensibility.

'Some of its elements persist and combine with elements of the epicritic stage to form features of normal cutaneous sensibility. Thus the cold and heat of the protopathic stage blend with the

FIGURE V. A DIAGRAM OF THE VIIIth CRANIAL NERVE SHOWING SEPARATE STALKS FOR AUDITORY AND VESTIBULAR MESSAGES



(*Details taken from Poirier*)

modes of temperature sensibility proper to the epicritic stage and form the graded series of temperature sensations which we are normally able to discriminate. The crude touch of the protopathic system blends with the more delicate epicritic sensibility of this kind, while protopathic pain, with its peculiarly uncomfortable rather than acute quality, forms a much larger element in the normal sensibility to pain.' [1]

Now if we reflect that the pain referred to is not felt in the area of skin in connection with the severed nerve but more probably in the end-organ of the thalamus, at any rate during its crude stages, the reasonable alternatives open to us in interpreting its course are only two, if we do not in the old-fashioned way refer everything to the upper brain. Either no selection occurs at all, so that each fibre or strand, severed, unsevered or convalescent, manages its own business and fixes the destination for its own messages, or else in the thalamic centre, which receives the vital elements of sensation, a selective discretion is exercised, inhibiting unnecessary crudities so long as the apparatus for delicate discrimination is in good order, and permitting protopathic sensibility to come into operation whenever the epicritic machinery has broken down.

The two less reasonable interpretations, in my opinion, are that there is a confused competition of separate paths, each pouring in its quota to a general compound reflex sensation, or that the remoter cortex imposes its delicate system of sensibility by inhibiting all or part of the more vital and energetic but irregular system.

In the absence of very clear indications I decidedly rule out the latter two possibilities and consider also that minute local autonomy in sensation is contrary to the natural amount of meaning which our extraordinarily ingenious mental constitution requires for its interpretation. There is sufficient evidence for an instinctive faculty or form of thalamic intelligence to account for the skill with which one system of sensibility is enabled to constrain or inhibit the other, no doubt by suitable mechanism, or to replace the finer one by the coarser one on emergency, or to provide for the infinite patience and discernment wherewith the second system can collaborate with the first during a period of temporary co-operation. We must remember also that the vital centre is more likely to control the centre of judgment than that the opposite practice should be the rule.

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[1] P. 24.

CHAPTER XIX

THE MEDIAL NUCLEUS AND THE INTERCALATED CELL—THE SPECIAL SENSES AND THEIR MACHINERY

THE special difficulty, which was dealt with in the conclusion to the last chapter, referred to the control of the dual systems of sensibility coming into the thalamic region. Whether these streams were or were not controlled in the thalamus, there is no doubt that they were for the larger part separate streams with separate origins at the periphery. They are known respectively as the epicritic system, on which our special senses particularly depend, and the more primitive protopathic or dyscritic system, subserved by the Edinger fibres. Their relations have been more accurately determined in the case of noci-ceptive impulses and cutaneous sensations than in other respects. The two systems are not only to some extent alternative and supplementary in consciousness, they are also superposed on one another in intimate local contiguity and on special occasions the impulses arising from each can be dovetailed into those of the other with marvellous harmony.

Some form of oversight I believed to be necessary for the management of the dual system, inhibiting one so as to give the other full play, reinvigorating the silent partner so as to supply a service lost by injury to the other and finally interweaving the two for temporary purposes during a transitory condition on the way to health. This supervision I imagined was located in the medial nucleus of the thalamus, probably in the central (*b*) section.

Complicated as the dual sensory hypothesis undoubtedly is, it does not exhaust the complexity of the situation. Besides the diverse streams of epicritic and protopathic impulses entering the various parts of the thalamus and mostly passing to the ventral nucleus, there is admittedly a central current of undivided impulses coming up the median fillet, and possibly from elsewhere, into the ventral nucleus and subject to further division at that point. What happens at that point is the deepest mystery of sensation of which we are yet aware. Possibly more difficult things will yet await more skilled investigators.

Perhaps either or both these crucial problems occurred to Sir John Parsons, when he wrote that 'the fact that dyscritic and epicritic forms of response are subserved by different anatomical neural structures indicates that some other, as yet unknown, factor comes into play'.[1] I do not presume to determine the functions or even the identity of what Parsons calls the 'unknown factor', but I suggest that I know where he may be found. Sir Henry Head has already drawn attention to his location. He is personified in the little central cell, or group of cells, marked in the ventral thalamus on the diagrams in Figs. I and II and called by Head the intercalated cell.[2] He is situated there to preside at the separation, to be its instrument and possibly to determine the destination of an unknown number of undifferentiated sensory impulses, part of which pass to the medial nucleus of the thalamus and part pass on to the cortex.

Beyond the rough division of the greater number into two broad classes we do not know what impulses go to which end-organ when they arrive at the thalamic junction. I am concerned with the fact that some at any rate go to the medial nucleus of the thalamus, probably to the central section (*b*), where, so far as we know, there are no outgoing fibres or cortical projections. Its near neighbours are: (1) the lower section (*a*) of the same nucleus with large cells and cortical projections; (2) the mysterious upper small section (*c*) with small cells; (3) the unknown anterior nucleus which may possibly communicate with the cortex; and (4) the pineal body above.

Turning round on all sides from this narrow retreat we have all the apparent indications of an end-organ. The material is composed of cells similar to those of the grey matter of the brain. Here no doubt take place the small successive explosions which produce consciousness of an affective order. Here goes on a vast amount of extra-conscious vital effort. Here probably occur a few intense thoughts, of which fewer still ever find their way in any clear-cut form into consciousness. Here begin the embryo instinctive impulses, which later become resolves and motives for action. Here are laid the deep foundations of many a character, whose outlines endure untouched by mental processes and intellectual influences throughout a lifetime.

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[1] *Perception*, p. 241.

[2] See illustration on p. 593, *Studies in Neurology*, Part II.

It seems to me that at the narrow doorway of the group of intercalated cells leading to the inner chamber, which is either a meaningless blind alley or a point of concentration of vital significance, the counter-arguments from body to mind and from mind to body are put to the proof.

If we think it worth while to pay attention to structure, we must think that structure has meaning. The body to mind induction leads us to attribute mental importance to a mass of neural matter placed in a situation where indispensable neural paths are crowded to a common centre. The reverse deduction from the known habits of mind and their relations to neural paths inclines us to believe that an active mental capacity identified with a recognized centre has local significance, and thus we are led to conclude by two courses of reasoning that an instinctive influence operating in section (*b*) of the medial nucleus of the thalamus would dominate and possibly affect the stream of impulses passing through the intercalated cell in two currents, one of which is destined for the end-organ itself. The primary activity of the latter would be directed naturally towards the fulfilment of its own particular functions. In other words, the instinctive faculty will be likely to exercise a certain choice on what impulses it will have transmitted direct to itself and what it will allow to be sent on to the cortex.

It is unlikely that this choice can be considered a free choice in any broad sense of the word. As regards most somatic sensations it is certainly physically conditioned by the two rival systems of sensibility brought in by the separate sets of afferent nerves. As regards the messages of the special senses, as we shall see, similar conditions to some extent prevail. Dual systems for sight and probably for other senses predominate. The details still remain to be worked out. It will be long before we know all the complications even of special cases. Still outside these fixed and highly organized systems no doubt there remains an indeterminate mass of sensation, where various degrees of freedom in selection hold the field, of which we at present understand almost next to nothing. It is possible that among this undifferentiated and as yet unassigned mass of impulses, not we suppose very large, are to be found the elements of our affective life, the materials of our emotions and our passions, as well as all that constitutes the so-called free portion of our intimate personality.

Leaving perforce undetermined the greatest of all problems at the headquarters of the sensory system, we may turn to consider a few points of interest about the immediate staff of the special sensory equipment, which may throw light on the question of duality, not only in mental questions but in those important branches of receptive mechanism which supply information either to the cortex or to the thalamic region. Fortunately there are not many of exceptional interest which are not already covered in the general treatment of somatic sensation. The old classification of five special senses, touch, taste, hearing, sight and smell, only brings in three new cases of importance and leaves others quite outside. The three latter cases, auditory, optic and olfactory, claim further attention and at least three others deserve further consideration. The cases outside the special ring include the so-called vestibular sense or otherwise the static, gravistatic or sense of balance linked in a complicated fashion with the organs of the sense of hearing and possibly acquiring thereby relations with our auditory sensations that are peculiarly intimate. The second usually unacknowledged sense of possible great importance is the muscular sense, which has been very little studied; in fact it has come to rank as a special sense only in recent years; it is probably subserved by the specific protopathic sensation of extreme discomfort, which I have called 'structural alarm'. Lastly, I believe special interest should be devoted to the internal and uncontrollable visceral sense, which is connected with the Xth cranial nerve, called the vagus or pneumo-gastric nerve, which seems to be predominantly related to the para-sympathetic system and perhaps rather belongs to the realm of the bulbo-spinal nervous region and therefore lies outside the limits of our present area of investigation.

It is convenient to consider the visceral sense as a special sense of definitely protective origin, which is unmistakably connected in the most intimate manner with all extreme emotional manifestations. By most people it has been held to be subject to a resultant from the immediate effects of emotion. More recently it was argued in the James-Lange theory that the visceral sense was the origin and even the sole cause of all emotional feeling. The truth probably lies neither in one extreme statement nor in the other.

Although its most powerful effects take place below, they both start from and by their reactions cause fundamental effects above, the bulb and in the cranial region. Of late the vagal system, where

I have located this special sense, has been linked with the mysterious gland called the conarium or pineal body, and, if there is any foundation for this attributed connection, the visceral sense would thus be brought into close relations with the thalamic region and its far-reaching system of sensibility. The commotions in this sense seem to affect very powerfully the feeling-tone of the body. It is only right here to say, however, that as the association of the conarium with the vagus is highly speculative, too much stress must not be laid on any supposed bridge or control by the thalamic region over visceral sensibility.

The number of senses has been put as many as twenty or higher, which appears to be a matter of definition. They are for us of a decreasing order of importance, as they go farther away from the twelve cranial nerves, where they come rather under the category of dealing chiefly with reflex actions.

The history of their evolution has been remarkably different. There is, in fact, room for so much difference of opinion that they might well form the subject of a special study. The development of sight has accompanied locomotion, perhaps aiding it or following it or doing a little of both. Our organs of sight must carry in them a good deal of our history of dwelling among trees and running about in low vegetation. Our hearing is very closely associated with the static sense and it may well be supposed that it was influenced in its development by the common use of a single apparatus devoted, not only to hearing but also to balance. No doubt they once had a common path to the brain in an undifferentiated VIIIth cranial nerve, while both the vestibule and the cochlea may have been separately developed out of one uniform ear, which at one time perhaps served two purposes.

Touch, as touch, has not been differentiated in its receptors to anything like the same extent as either sight or hearing; but it may be that external and internal touch have been broken up into several different senses, such as hot and cold temperature, pain, visceral and otherwise, special susceptibility to colour, etc. Taste in particular has been refined by the evolution of four different available receptors for flavours in the tongue and mouth, as for bitter, saline, sour and sweet sensations. Smell has been called 'taste at a distance', and has been regarded as a decaying sense, but I have reason to believe that its intimate relations with the cortex point to a different history.

Distance from the centre of the body is what I should prefer to regard as a basis of classification for senses of all kinds. We may start from unknown differences in sensitiveness to light and colour vibrations on inner surfaces and work outwards to external surface sensibility. Of all the deepest would be the muscle senses, which may surround the bones and guard the frame. Somatic senses would include pain and other noci-ceptive impulses. There are most probably receptors for grato-ceptive impulses of narrow range, to be classified apart from touch-spots, warm-spots and cold-spots, which can already be mapped out on the skin.

Semi-somatic senses would be a class of senses which depend on contact with objects, apart from mere touch, in that they have power to estimate the nature of the bodies in contact. They have chemical or some similar sensibility. They would include taste and smell and possibly bodily sensitiveness to acids. There is, however, one double sense which escapes this classification, because of the intimate linking together in their instruments of the vestibular or balancing sense, which is somatic and semi-somatic, with hearing, which is undoubtedly an internal sense, as with the deaf, and also a projicient sense through the delicacy of perception of distant vibrations by the ear.

The fact that the auditory and balancing senses have (1) linked[1] neural paths to the bulb; (2) closely allied points of departure in the human ear; and (3) the same point of arrival in the internal geniculate body at the great thalamic junction for sensation, lends some colour of probability to the belief that their early common history has left special traces on their mutual influence on one another and on their common influence on our present mental states.

Finally, there is the one special projicient sense of sight, whose peculiar privilege it is to carry the self outwards to meet surrounding and distant objects. Its supreme function of creating for us a world of extension, replacing or supplementing that other world of time, has been called space-perception. It has been the subject of intense study, especially by the great German physicists under the leadership of Helmholtz, and has been recently analysed for us in great detail by Sir John Parsons.[2]

Our eyes are either, as Sherrington suggests, 'glorified warm spots' or they may be organs developed out of small areas of skin peculiarly sensitive to pressure and registering a greater and greater delicacy to the touch of the finger of light. It would give a picturesque version to the origin of the pineal body, if we personify it as an organ of exceeding impressionability, functioning on the upper surface of the sensitive brain mass, as a register of pure pressure from light, and becoming so efficient and supersensitive that it needed special protection. So in the plesiosaurus it may have been a third parietal eye, as the beast fumbled about with his nose in the marsh, half in and half out of the water. We can imagine it surviving in primitive creatures like hag-fish and lampreys, as an eye or pair of eyes, with a suitable lens of water above them; but descending for protection into the skull in crocodiles and lizards and finally coming to rest in the safest place in the centre of the head between the two cerebral hemispheres in man and above the medial nucleus of the thalamus, where its sensitive soul must rest in peace, because there is no safer spot.

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[1] In illustration see Figs. V and VI.

[2] See especially his two great works: *The Introduction to the Theory of Perception* and *The Introduction to the Study of Colour Vision.* (Cambridge Psychological Library.)

Our ordinary organs of sight are the centre of the most delicate and complicated vital mechanisms of which we know. Unlike hearing, which has only one half of the so-called VIIIth cranial nerve for its use, the eyes are subserved by four cranial nerves. The IInd cranial nerve is the optic nerve with sense impressions; the IIIrd nerve controls the constrictor pupillæ, which protects the retina; and the IIIrd and VIth oculo-motor nerves, with some motor help also from the IVth, pull the little adjustable muscles which twist and roll the eyes in their suitable positions.

As for the elaborate arrangements with crossed and uncrossed fibres [1] for overlapping the fields of vision and centring the sight, for focussing both eyes on varying distances, for adaptation of scotopic vision in the dark or for photopic vision in the light, and for perceiving colour vibrations, time, space, knowledge and skill would fail me to indicate them. I may mention only that probably through the comparatively small group of optic fibres, dispatched to the pulvinar in the lateral nucleus of the optic thalamus, the eyes can pull the whole body about and adjust hands, trunk and position of head for their purpose of preparing the frame and active muscles for instantaneous motor action in connection with sight.

In the eye itself there is a double apparatus of rods and cones for visional object analysis, of which the former is identified by Parsons with the dyscritic or protopathic system and the latter with delicate epicritic discrimination. In the retina there is a macular or rod-free area, where epicritic vision is concentrated.[1] From my point of view the minute and precise relations of the eyes with the thalamus furnish those facts which bear most closely on the doctrine of duality in sensibility. It is quite possible that equally valuable correlations may be obtained from the arrangements of other sensory messages, but they are not yet available. For the sight they have been worked out for us in detail by Sir John Parsons.[2]

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[1] In lower mammals all the fibres are crossed, whereas in more highly developed man one quarter of all the fibres are direct.

Sensations of vision pass along the optic fibres in the IInd cranial nerve in three directions, to centres of which one is dyscritic, one is probably epicritic and one is divided between the two systems. The first is the tectum opticum (otherwise called the superior colliculus or anterior corpus quadrigeminum), a small but highly important body in the mid-brain, which has no cortical projections, although it receives fibres from the cortex. The second is the pulvinar, which we have already seen to be the lower part of the lateral nucleus of the thalamus. Parsons calls it a correlation area intimately connected with the erect posture of the body, no doubt developed gradually during the days when man began to practise rising from all fours, so that the eyes might be used in looking about over scrub, bushes and growing crops. Owing to the fact that the pulvinar has an extremely rich cortical projection to the angular gyrus of the cortex, which is half-way to the special optical region in the occipital lobe, the retino-pulvinar fibres are placed by Sir John without hesitation as belonging to the epicritic system.[3]

The external or lateral geniculate body, shown at the bottom of the diagram in Fig. II, presents a greater problem. It receives about three-quarters of all the fibres of vision from the IInd optic nerve and probably controls the better, as well as the larger, part of our means of exercising photopic chromatic vision, the most powerfully organized and most superbly differentiated of all the human senses.

Through its binocular stereoscopic apparatus with both eyes focussed in front it has given man the means of controlling the world. So fine a group of specialized impulses coming into a close corner of minutely organized physical structure will offer us the best possible example of the meaning and significance of the different degrees of co-ordination in sensibility, provided always that clear indications are present of the division of the group into two streams and of the definite assignment of one class of sensation to a superior centre and of the dismissal of the other to a humbler destination.

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[1] *Perception*, pp. 181, 232–3 and 236–7.

[2] *Ibid.*, pp. 124, 231–4.

[3] *Ibid.*, p. 234.

We have strong reasons to suppose that some of the geniculate optic fibres are served with higher co-ordination while others are not. We are fortunately able to distinguish which is which, because the external geniculate body has two nuclei, known as the dorsal and ventral parts, whose characteristics can be inferred from their history and connections. The ventral part is phylogenetically older and therefore probably dyscritic in its functions. The dorsal nucleus shows two indications of belonging to the epicritic system. It receives from the retina the superior macular fibres, actuated only by cones and therefore subserving the more delicate form of perception; and it benefits also by cortical projection. Parsons therefore argues convincingly, that the great majority of the retino-geniculate fibres carry the impulses of the epicritic system, but that those which pass to the ventral nucleus may be ranked as dyscritic.[1] It is not unreasonable to assume from this close conjunction of both kinds, that on occasion one system can be called in to replace the disasters of the other, as in the Head experiments with cutaneous sensation.

Among the selected senses, selected here, that is to say, according to their apparent relevance to the question of dual sensibility, vision stands at the head owing to its marvellous double adaptation for crude and elaborate exercise of its functions, more so than in the case of touch or cutaneous sensation. It must be admitted that Sir John Parsons is essentially right in identifying the duality of dyscritic and epicritic vision with the wider duality of protopathic and epicritic sensibility, although the exactness of the parallel is not worked out to the last detail.

Another point about vision is a curious fact that applies to all the selected senses except one, whose significance will be noted later. Even the immense influence of vision on character, and particularly its intellectual quality, comparatively free from affective influences, has not procured it immediate access to the cortex. All visual impulses pass to the various quarters of the thalamic region before being relayed to the cortical hemispheres; but they seem to proceed like reflexes by groups in special courses from minor centre to minor centre; nor do they appear to be subject in any case to chance division nor selected diversion into the medial nucleus of the thalamus.

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[1] *Perception*, p. 233.

It is curious to turn from the complicated organization of sight, combining numerous and richly organized instruments with a single simplicity of concentration on one particular purpose, to the very opposite arrangement or want of arrangement about hearing. Vision has full control of its own little world. Hearing has only a divided authority in its own realm. As far as delicacy of perception goes, hearing has an immense differentiation through the ear, almost as great as that of vision; but it has not got all its organs to itself, neither the receptors, nor all the stalks of the VIIIth nerve, nor its special home and junction in the thalamic region. In all its course, and probably in its phylogenetic history it is involved in intimate relations with another sense that is certainly of equal rank. In some ways the static or balancing sense may be held to be of greater vital significance than that of hearing, although it does not present itself in the same light of having an intense emotional import. But there appear to be grounds for thinking that the close relationship of the two senses in many ways adds to their very special human significance in each separate case.

The joint and separate organs for the auditory and balancing senses are of immense psychological interest. Hitherto they have been studied chiefly from the point of view of their differences and for the varied and picturesque arrangements of the inner ear and of the famous semicircular canals by which we are informed of our static position. Fascinating as they are, there is no room for them here,[1] because the course of my argument obliges me to throw emphasis on all the opposite features of the peculiar situation. Possibly both hearing and balance were senses allied in their origin, but they are not, like taste and cutaneous sensation, in the course of being separately differentiated. They are allied in very peculiar ways, because they start almost together, take different paths to the bulb, reunite in order to enter the thalamic region and finally enjoy together certain particular privileges and probably suffer from the same pathological defects. They are literally like twins, born together as apparently separate individuals, yet sharing a common mysterious nature which brings them oddly together both in prosperity and disaster. As I am convinced that at the bottom of all their affinities there is some far from insignificant meaning, it seems to me more vital to throw stress here on all their resemblances than on their obvious dissimilarities.

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[1] Details of the canals and otoliths, of the tympanum, of the cochlea, of the hammer and anvil can be found in any good American book of psychology, such as those of Warren or Woodworth. William James for this purpose has to be reckoned as considerably out of date and the illustrations in particular have not been altered to suit modern information.

The organs of the auditory and vestibular senses occupy a very large section of each side of the head, whose geography is exceedingly complicated, while the contents are not packed together with the same neatness and efficiency as in the case of the optical machinery. Together they probably exceed in size the whole of the thalamic region. The group is called generally the labyrinth, a word sometimes used to denote only the vestibular region.

Inside the labyrinth I shall particularize only two localities, which must stand for the groups of subsidiary passages and cavities with their several important functions. The first is the cochlea or inner ear, so-called from the Latin word for snail on account of its spiral shape. It is the inner or auditory ear. It is joined on its upper end by a passage leading to a chamber or vestibule, which is the largest of several cavities communicating with the central vestibular organ. This second is a combination of three semicircular canals, joined by their ends; they are peculiar tubes holding a certain liquid by the motions of which our static positions are indicated. The three tubes are placed very nearly at right angles to each other in the three planes of space. Only the horizontal plane is thirty degrees out of its true level.

The two organs are situated within each side of the head about opposite to the outer ear, with the cochlea below and well to the front. The group of canals are about opposite to each eye, a little above and tilted slightly backwards. They lie each side of the thalamic region and below the great cerebral hemispheres. The two organs communicate with each other directly and send their impulses inwards to the bulb or medulla oblongata by two separate stalks, belonging to the VIIIth cranial nerve, which are so intricately associated, one almost entwining the other, as shown in Figs. V and VI, that they were for long taken as a single stalk and given only one name.

After leaving the bulb the two sets of impulses divide up before passing to the thalamic region. But they do not divide up into two streams, one auditory and one vestibular, but auditory and vestibular messages pass up together, to be separated again according to class or degree of development and not according to their original nature. One joint group goes to a humbler protopathic destination, while the other and more important joint group passes into a very particular and interesting situation.

But before opening up the intricacies of a new and unique feature of this joint entanglement, a glance must be taken of a lesson that may perhaps be learnt from the pathological side of the auditory and balancing senses. They are both jointly liable to lesions of a hereditary character and also to the same kind of damaging nature from acquired disease. Now both these senses are attacked in a very peculiar way. The lesions show themselves just at the points of departure of auditory or vestibular messages to the bulb. Both nerve-stalks leave for the bulb at almost the same spot. But the hereditary lesions attack the two organs just before the impulses separate and the acquired lesions attack the nerves just after the point of separation. But in either case a joint attack on both senses together is very common.[1]

The joint impulses of the two branches of the VIIIth nerve-stalk pass after leaving the bulb in two directions. Part go to the posterior corpus quadrigeminum, companion to the tectum in the mid-brain and probably like the latter a dyscritic centre having no cortical projections. Part also go to the internal or medial geniculate body, a centre which amongst all these intermediate junctions enjoys a very peculiar distinction, in that it not only has a cortical projection with thalamo-cortical fibres passing to the upper brain, but it also receives, alone of all the significant centres in the thalamus, its private stalk of cortico-thalamic fibres from the cortex. Its double privilege certainly suggests that the auditory and static impulses which pass this way belong to the epicritic system. Sir John Parsons, however, places it a little uncertainly in this respect and regards this body as having both dyscritic and epicritic functions.[2]

The point would not perhaps be worth so much emphasis, if it had not been too much the custom in scientific literature to disregard 'meaning' in the technical sense. Many writers have been so afraid of seeming to see in Nature the 'evidences of design', using this term also in the technical sense, that they have forgotten the accumulating weight of evolutionary proof, that certain features do not appear accidentally in structure but only because experience has demonstrated that they have become indispensable. That is the plain meaning of the modern term 'meaning', and, if it approaches sometimes the significance of the old term, 'design', that is no real reason for rejecting it.

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[1] See Dr. L. Baldenweck, *L'Exploration de l'Appareil Vestibulaire*, p. 274, and particularly the illustration on p. 275.

[2] See illustration on page 93 of the *Introduction to Theory of Perception*, also pp. 92–3 and 118.

Interesting as are the facts concerning the careful distribution of optic impulses, the study of the transmission of auditory, rhythmic and balancing impulses is even more suggestive. The great problem offered by the details of structure in the latter case arises from the intimate alliance between two senses, the conjunction of the channels of which cannot be fortuitious. Remark the significance of these three cumulative facts: first of all the close alliance in the use of the originating organs; secondly, the common use of the same path for two separate stalks of the VIIIth cranial nerve, the two streams dividing, converging, reuniting and redividing on a new principle; thirdly, the common use of the same quarters in the thalamic region, particularly by the group which passes through the specially favoured corner of the internal or medial geniculate body.[1]

The question really is whether the linking together of the auditory and static senses is not much more than fortuitous. Is it not possible that the static sense is far from being concerned only with balance and position and not also with vibration and rhythm? Is not our sense of time obtained by an inner perception of the pulsations of plastic tissue, arising from a power of discrimination of fluid motion far more delicate than any derivable from a muscle sense anchored to the bony framework of the body? For such a purpose would not the minute power of analysis of the motion of liquids, possessed by the sister sense of hearing, be more efficient in interpretation than that of all the other senses together?[2]

Rhythm and sound together furnish the sensory material of music, where many thinkers see the summation of all the emotions. Maybe the exceptional closeness of musical influences to unknown depths of our nature can be found in the reconciliation or reunion in consciousness of elements of sensation that are at once so near and have been apparently so far apart.

The double case of balance and hearing is the best instance of the peculiar differences with which certain senses are treated in the elaborate and extremely efficient arrangements existing within us for the distribution of their impulses between the two ultimate centres for the absorption of protopathic and epicritic sensibility.

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[1] See the cortical paths in Fig. II.

[2] For a further analysis of this point see note at end of chapter on *The Perception of Time.*

It is safe to say that nothing happens by chance, that no connection is haphazard and that the stern master of well-worn utility lies behind many minor details which have hitherto been neglected.

It is curious and significant that all the apparatus of vision seems to be expressly isolated and carefully planned with a tremendous concentration of machinery for a specific purpose. Static and rhythmic balance, on the other hand, are entangled, but not carelessly entangled, with the auditory sense, and the resulting co-operation, whether the combination is due to accident or to affinity, appears to have powerful effects on the instinctive and emotional side of sensibility.

For that very reason perhaps the central recombination of the best elements in the separate senses in the internal geniculate body of the thalamus at the very spot where both auditory and vestibular messages are relayed to the cortex, is significant of a complex process of exquisite and vital utility. It is more than probable that it is not for nothing that the reunited groups of messages are here subject to the peculiar privilege, unexampled and enjoyed by no other sense junction, of having communication both ways with the cortex, down as well as up.

Although it seems a very slender thread on which to hang a special hypothesis, I cannot refrain from making a suggestion as to their unusual selection for a supreme refinement in mental organization. Downward connection from the cortex to the thalamus suggests peculiar need for cortical control by backstroke. Since the combined rhythmic, vibratory and auditory impulses have extraordinary emotional power, they must be subject for that reason to a special demand for exactness and delicacy of definition. Time relations of the whole system, depending on our vibrational capacity, are therefore in this special instance critically controlled and revised by the cortex by means of the singular cortico-thalamic fibres linked with the medial or internal geniculate body.

A very remarkable fact is also related to the passage of impulses from the organ of the sense of smell, that asks for interpretation. Olfactory impulses are comparatively simple and almost as few in character as those of taste. They break into our serious life on only rare occasions and we usually give them very little overt attention. It is fashionable to conclude that they are of slight specific importance and that the olfactory sense is a receding one from the evolutionary point of view. There probably could be no greater mistake. We do not often consciously accord it our notice, but in spite of the usual faintness of its impressions their effects on our general feeling are spasmodically powerful. They are linked in an emphatic way with our affections and our suspicions. They have a peculiar hold on the memory. They are decisive in their qualities of attraction or repulsion, exquisite in their fragrance and horrifying in their capacity to disgust.

The messages of smell have a specially short cerebral journey and they are alone among the impulses of sense in passing almost immediately to the cortex. The diagram in Fig. IV illustrates the olfactory paths which traverse the uncus on their way to the hippocampal gyrus in the cortex, only throwing off a side message to the thalamus, which goes apparently to the ventral nucleus.

In one way the sense seems undifferentiated like taste, because it has no apparent division of its impulses into protopathic and epicritic forms; on the other hand, since it may be judged to belong clearly to the cortical or epicritic system, in spite of the poverty of its material from the quantitative point of view, we might possibly attribute this fact to its having shed its dyscritic or protopathic stage altogether. There seems to be no evidence as to this point. On the phylogenetic route of progression to man it must have been in some animals a highly important sense and no doubt subject to ample differentiation. Simplification of smell in man does not, however, necessarily imply a loss of power, as is generally supposed.

Even in man smell has not fallen behind taste. Zwaardemaker [1] has told us that the range of odours is far more delicate than that of tastes. In the former there are nine classes recognizable very easily with many subdivisions:

Ethereal like fruits; aromatic like camphor; fragrant like flowers; ambrosiac like amber; empyreumatic like tobacco; alliaceous like garlic; hircine like cheese; virulent like opium; nauseous like ordure.

In this classification it will be noticed that the balance is even between good and bad, with four definitely on each side. The one which seems decidedly optional in a sense is that of tobacco, which many people naturally dislike but which most people can bring themselves to enjoy, if they have a will to it. The adoption of the tobacco habit is the cult of indifferentism in olfaction; in very few remains the power to take it up or to drop it as they please.

Alternatively to the presumption that the protopathic form of

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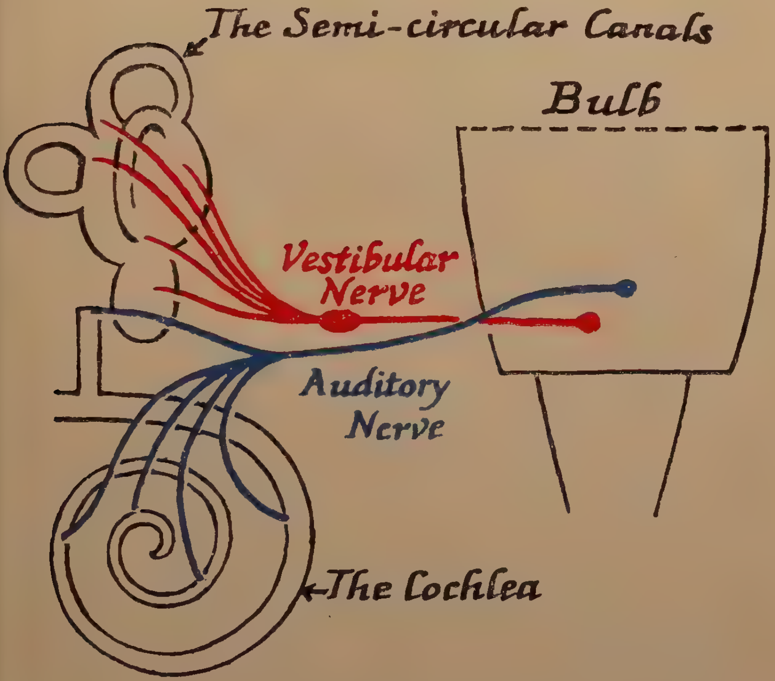
[1] Quoted by H. C. Warren, *Psychology*, p. 197.

FIGURE VI. A DIAGRAM OF THE

INTERNAL MECHANISM OF THE RIGHT EAR

front to back

[view from ~~back to front~~]



(*Details taken from Baldenweck, Pitres and Testout*)

smell has been lost, there may be the possibility that the sense of taste is the separate development of protopathic smell. The organ of Jacobson, now closed in man, gave openings in the roof of the mouth of prime importance to grazing animals obliged to feed roughly without the help of binocular sight. Smell to them would be equivalent to epicritic taste, or conversely taste would be protopathic smell, one superimposed over the other like the two systems of cutaneous sensibility in man.

Both taste and smell were no doubt special chemical differentiations of touch or all of them together variations of general cutaneous sensibility. Sir John Parsons seems to hold the view,[1] not very positively, that the evidence for epicritic taste is so meagre that we may conclude that taste, as a separate sense, may be presumed not to have reached an epicritic stage of evolution. The argument from structure, as to taste being a separate sense from smell, lies in the fact that both olfactory and gustatory sensations have each a cranial nerve to themselves, the Ist and IXth respectively, whereas the more responsible senses of hearing and balance have only one overburdened VIIIth nerve to serve the two of them.

It is curious that in spite of its real range and delicacy the content of olfactory material seems small, while we make so much fuss over the coarser sense of taste. There may be two reasons for our over-depreciation of the former and both of them seem to take their origin from habits that may be denominated as intellectual, that is to say, as being cortical and not thalamic.

Firstly, we seem to give less primary attention to the affective quality of any odour, such as its variety, while we immediately try to penetrate its content, its origin and its meaning. Whatever the nature of the odours may be, they seem always to embody for us delicacy on the one side and the threat of danger to life or to our moral balance on the other.

Secondly, perhaps even consequently, most of us avoid the solicitations of odours, bad or good, on account of their disturbing qualities. We prefer to keep a 'tonus' or bracing of the nervous system, a healthy rigidity of self-defence by automatic abstention from pleasant or unpleasant odours. This inclination is symbolized and preserved in the phrase, 'a clean smell', meaning absence of patchouli, or onions, or drains, or of disinfectants. The tobacco habit, perhaps, is the cult of olfactory indifferentism.

We have now considered the four or five special senses, whose source of impulse arises in the head, as contrasted with others drawn from the body generally. In summing up the question of their relationships to each other and also to the dual points of receptivity, the thalamic and cortical regions, we see that there is no common course and hardly a common method in their presentations. The differences between their several modes of presentation without doubt have great significance, but we ought not to insist too much upon them in view of the present limitations to our knowledge.

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[1] *Perception*, pp. 86–8.

A word may be said as to the relative total content of the various senses. The content of vision is immense. It is the direct and indirect source of most of our knowledge. Directly through the eyes and by optical magnifying instruments it presents to us space and 'things in themselves'; indirectly through the spectrum it analyses the constituents of space; and chiefly by signs, written marks and print it carries us outside time and breeds thoughts. Hearing by itself gives us a rich but not a large content; by its close alliance with balance and rhythm it carries all the auditory content straight into our instinctive life and keeps it within time, by which I mean that it prevents some kinds of feelings from passing too easily into thoughts. Smell gives us only a few rare facts; but they are of vital import, because so often hate and love and more often the love of children is fostered by them. Taste by its alliance with smell subserves some commonplace but often repeated functions. It is the basis of many habits. The remarkable prevalence of tobacco-smoking and tea- and coffee-drinking, which are growing habits, contrary to alcohol-drinking, which is on the decline, show what permanent influence is exerted on our habits by the particular sensations which are on the borderland covered by both taste and smell. On the whole I incline to believe that they constitute two forms of the same sense, which has been split up by the odd appropriation of olfactory sensibility to the cortex itself.

Coming to the more general senses of the body there is a vague but not a pressing problem presented by what Head and Rivers have called 'deep sensibility'. It does not fit into the duality of protopathic and epicritic sensibility; yet the authority of these two names demands some special recognition of its separate importance. It seems to me a protopathic form of the special muscular sense, whose epicritic form is what we call elasticity or resilience of the muscles generally, which plays so large a part in maintaining the 'tonus' or healthy rigidity of the muscles in repose. The 'all-

or-none' response of 'deep sensibility' occurs where pressure attacks the bodily and bony frame as a whole, and particularly the skull. It seems to touch all the instincts of self-preservation together, instead of separately, as ordinary pains do. It arouses general discomfort out of all proportion to its pain intensity and for that reason I have called it 'structural alarm'.

It seems to me that structural threats of danger play a very large part in the pain-discomfort system and probably constitute the basis of the mysterious 'shock', which occurs where extra-conscious nerve and frame injury has occurred. 'Shock' is in fact the physiological expression of extra-conscious protopathic pain-discomfort, exerted by and implying the resistance of the ordinary muscle sense. It is usual to consider pain as only an element of consciousness, whereas it is the outcome of something more fundamental, which chooses to appear chiefly in consciousness, because only in consciousness will it obtain the requisite reaction which the basic need of the body requires.

More deeply puzzling still are the visceral senses, of which for aught I know there may be several. They are linked up by emotion with instinctive or thalamic activity and vitality. Lying on the whole below the level of the medulla or bulb, their courses lie rather far from my central subject. A visceral sense comes into the immediate purview of mental duality through two circumstances. The first is its probable initiation in a cortical impulse. The second is its control over the heart, lungs and visceral group of reactions, called the para-sympathetic or extended-vagus system, actuated by the Xth pair of cranial nerves and two others.[1]

There is much light to be thrown on the question of mental duality by the close examination of structure in the human brain and by the survey of its immediate neighbours and neural connections. It will not solve all difficulties. Accustomed as we are to use the body to mind argument as a matter of practice every time we try to clear our heads by curing a cold, no thinker is unaware nor can long forget, that logical difficulties arise in any attempt to establish important truths by its means.

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[1] Dr. Miller in *Types of Mind and Body* (pp. 8 and 70) points out that the para-sympathetic system itself is in opposition to the sympathetic system, both being autonomous and independent of the will. The para-sympathetic system consists of two parts: (*a*) the cranio-bulbar part, dealt with in the text; and (*b*) the sacral system governing sexual and lower organs. The sympathetic and para-sympathetic systems work into one another in harmonious duality, one stimulating and the other inhibiting internal and intestinal reactions. Both use glands and their secretions for their activities.

Yet it is our duty to examine body facts; it is our natural method of procedure to establish normal sequences and continuities by observation and to reason from them; it is obviously useful to bring parallels from mechanical processes to bear on apparently similar and closely linked series of mental events; and finally the assumption of the validity of interaction between mind and body must be held to be reasonable, as a working hypothesis if no more, in the present state of our knowledge.

On these grounds I venture to bring forward as presumptive proofs of human mental duality the evidence that there is machinery in the thalamic region of the brain to establish the existence of a stable organ with mental independence of the cortex. This stable organ is a centre for affective life and instinctive activity. It also shows symptoms of independent intelligence amounting to something more than sensation and possibly to what we consider and define as thought. We have on the other side from introspection evidence of the modes of working of such a form of independent and instinctive intelligence.

To give indirect support to this wider conclusion there is evidence, from recent well-founded sources, of a double system of sensibility, separately identified in our more important special senses and probably embracing all the sensations in consciousness. There is less evidence of minor dualities in space-perception and in control of the reflex activities of the body, which may have relations with the central mental duality. But it would be unwise to press the case for these minor dualities, until the case for central duality has been worked out much more completely than it is at present.

Lastly, it is highly important to realize the fact that the part played by consciousness in our mental life has been on the whole exaggerated in the past. Our activities of all kinds go on to a certain extent indifferently, both consciously and extra-consciously. Consciousness in operation appears to resemble a species of so-called mental illumination of bodily processes, enhancing their efficiency but not being the necessary condition of their existence. Mental duality is not at all a form of duality between conscious and unconscious processes. Nor has mental duality any infallible connection with outside dualisms, such as the relations between mind and matter, good and evil, nor even thought and feeling.

NOTE ON THE ESSENTIAL DIFFICULTY IN ACCOUNTING FOR TIME-PERCEPTION

Time-Perception does not, at the first glance, present the same obvious difficulties as Space-Perception. We are so sure of the apparent succession of the stream of mental events in consciousness, that we do not question either its validity or its origin.

Yet certain questionings must arise in due course under careful reflection and I believe that I can indicate the order in which they will naturally present themselves.

The *first* question arises as to Philosophical Time, which is provisionally satisfied in Spinoza's method by the measurement of Space or Extension by Thought. But the solution is inadequate, because Time or the negation of Time is an element in the definition of Thought. Nor is Space-Perception yet determined.

The *second* question is a double one. It arises as to (*a*) the difference between the various subjective times of each individual at different moments of his existence, which are obviously conditioned by his emotional and other affective states. Yet even the short-period average rates, which may be considered as steady in any one individual over certain stretches of his life, differ considerably as between one individual and another.

Thus it arises also as to (*b*) the difference between the average rates over both short and long periods in the psychologies of any two people. It is obvious that different people have different cycles of feeling, which are altered by education. These differing cycles of feeling result in different individual psychological time-rates.

The issues involved in both these discrepancies are shelved but not solved by the adoption of Common Time, based on light and darkness, seasons of tides and floods and crops and finally motions of heavenly bodies. These are observed and mathematical measurements based upon them, which are held to represent Real Time. Real Time is nothing of the kind; it is our own Psychological Time, which is itself a compromise.

The *third* question arises as to the influence of Common or Measured Time on the Self, which infinitely exceeds in importance the influence of any kind of Space on the Self.

Take such phrases as 'Here and Now', where *here* is often used as a mere reinforcement of *now*, without any local implication. In fact, local distances are nearly always mentally translated into Time estimates as between two people, calculated chiefly by the speed of locomotion. In matters of money interest Time-Rate has a value. In matters of pleasure *now* is balanced against *later* to the disadvantage of the latter. In spiritual issues the balance is generally phrased as between *now* and *hereafter*.

Pleasure in all its forms is to be reckoned as a function of Time, either Personal or Common Time; the essence of Feeling, as opposed to Thought, is held to be in Time; Time is the decisive feature in action as opposed to deliberation.

The *fourth* question arises as to the simultaneous mental grasp of a few seconds together and also of each second separately. This has been provisionally settled by Bergson's Theory of Intuition, which I have for Time purposes wholly adopted with such modifications as have been already stated in the text.

The *fifth* question is the most difficult. How do we perceive Succession in Time? We may be aware of the Sensation-Content of five seconds together, but we are not aware of the order of the separate events. Similarly we may be aware of five Second-Contents of Sensation separately, but we have then no bridge by which we can determine their precedence. Let me give two instances:

(*a*) Take a student engaged in work on a bitter day, with rain falling outside. He is interrupted by his daily treat of a tea-tray with hot food and drink. He leans back in a comfortable chair for a rest to take his first hot sip, when he at once becomes aware all together of the clear fire within, of cold and wet outside, of his serene repose, of his ample work done, of his slender task in the next hour. There is no order and no apparent lapse of Time. But his very next sip of tea is cold.

(*b*) Take the case of a man confined to bed with severe pain, yet having his wits about him. If his nurse and a friend come into his room by two doors soon after one another, he may be immediately aware of the presence of both separately without remarking which came in first. Yet hearing the door-bell ring at the usual time of his doctor's visit, if then his friend and the doctor come in at almost the same time, he will be well aware of which of them came in first.

We can only grasp the reality of succession by (1) Selection of one kind of Sensation; and (2) Concentration of Will-Attention on that particular kind.

James's phrase of 'stream of consciousness' is a picturesque description that is lacking in the elements of clear definition. Sensation comes in on us in rolling clouds and not in an identifiable succession of separate items.

The *sixth* question suggests itself that we need, as a full explanatory hypothesis, either a Time-Sense or a method of making an automatic Succession-Estimate. What is wanted is the means of cutting two kinds of entanglements apart, in order to get:

(A) Separation of one kind of thing from another kind;

(B) Separation of two things of the same kind from one another.

We probably have not got a Time-Sense, because our idea of a special sense implies the use of a special organ, of which we have no evidence.

The *seventh* question remains, as to how we are enabled to make an automatic Estimate of Time-Rate, as a key to Succession-Estimate. I can suggest that it may be obtained by the special physical conjunction of two organs. The peculiar and unexplained relations of the Vestibular and Auditory senses perhaps show that they are available for an exceptional task of capital value. Their special hold on the emotions may thus also be explained.

I suggest that, of the two linked senses, one furnishes the material and the other effectually acts as the instrument of comparison. The Vestibular registers internal movements of our plastic organization, the muscles, sinews, tissues and nerves, as contrasted with our bony frame. By the Auditory Sense we perceive the rhythm of our interior pulsations and vibrations in a fashion that we may call Sub-Audition or else unconscious hearing. The exaggerated internal hearing of the deaf gives us a key, by which we may conceive of its existence without clearly showing us the method by which it is exercised.

Blood pulsations, no doubt, count for something in this method of striking and noting Time-bars. So probably do the associated beats of the heart. Both kinds are partly appreciable in consciousness. It is quite possible, however, that neither have much to do with our Physiological Time-Rate, since there may be far more important vibrations of extreme delicacy, quite imperceptible to our gross sensibility of touch or to the deep muscle sense, yet measurable by the sensitive liquid and hair processes in our aural and vestibular apparatus.

We probably all of us have a Physiological Time-Rate, which hardly enters consciousness, except in indirect manifestations. It is partly expressed for us in a Psychological Time-Rate. The latter is logically a compromise, personally effected, between our individual Physiological Time and common Measured Time. It is subject to education in the direction of patience and of submission of the personal to the general point of view. Real Time for each of us is probably this form of compromise. It constitutes the basis of feeling, and affords us the exercise-ground of that mysterious psychical state or states to which we give the name of pleasant conditions and their opposites.

The fixing of a Physiological Time-Rate and a Psychological Time-Rate provides us individually with a method of Succession-Perception in the first place and a correction of this perception for a practical purpose.

The personal Physiological Time-Rate gives each of us automatically the means of determining Succession in our Sensations by enabling us to say *before* and *after* about any particular couple of events to which we turn our attention.

CHAPTER XX

CONCLUSIONS AND INFERENCES

The conclusion that gradually emerges from the converging arguments brought forward in the present study is that mental duality is a fact that cannot be put aside. There have been in the past more than one interpretation of such a supposed duality, but we have had to reject them by the process of referring them one by one to the mass of information recently acquired as to two distinct groups of our well-known functions, called mental, whether they take place within or without consciousness. It is a comprehensive conclusion, which involves many minor conclusions. The two chief minor conclusions are the existence of an instinctive intelligent faculty, lying on the physiological side of our central faculty of conscious reason, and the no less certain existence of an intuitive faculty lying on the intellectual side, a partner, in fact, of the intellect, but outside the limits of conscious operation.

There are other minor conclusions connected with sensibility which belong to the reinforcing body of evidence brought forward from the close investigation of our cerebral and neural organization. On this side of our study there is available a body of material which simply did not exist twenty-five years ago, opening out areas for fresh investigation almost overwhelming in their possibilities.

As I hope to show presently, we cannot reasonably use the same language which was current only a little while ago in leading books on similar subjects. It will be impossible in the future to speak or write of sub-cortical centres in a group as if they were mere junctions of about equivalent significance with subordinate nerve centres in the ankle or wrist, pulled by strings from a one and only supreme authority of cortical intelligence. There are internal cerebral fibres in plenty used for many purposes; but we must recognize the fact that in mental operations there are equally important groups actuated from below as from above.

As Professor Warren has well said, if we are to compare the interior of the skull, as a whole, to a telephone exchange, we must remember that all the lines work only one way. Some subscribers can call up and some can call down, but there are no wires on which ordinary both-way conversations can be held.

Before accepting these conclusions, even provisionally, it is only fair to examine carefully two very closely reasoned systems of thought which stand in the way of their complete acceptance. The first is to be found in Professor Lloyd Morgan's work on instinct and may be called a scientific theory of relations between instinct and the cortex. The second is certainly philosophical and largely metaphysical: Professor Bergson's brilliant discourses on intuition, which may be said to contain the poetry of the subject.

As I have to be very brief, I hope I may be forgiven for understating the force of the arguments in each case. In the latest [1] of a notable series of books, which have immensely advanced the theory of instinct amongst animals, Professor Lloyd Morgan comes to grips with the peculiar feature of instinct in man, its close relation to intelligence. As to this I am very closely in general agreement, but there are three important points, relating to method, where I cannot see eye to eye with him.

In spite of the fame of the young moorhen's first dive, which ought to hold its place in the classical history of instinct for ever, I deprecate the logical utility of parallels between animal and human instinct. The differences are too great and they arise from the fundamental distinction that man has, for reasons mentioned above, the power of self-knowledge.

Secondly, I cannot agree with him about the methods of research and discussion. He would deny the right of entry for all *a priori* deductions into a *scientific* universe of discourse. That would exclude not only Bergson, Driesch and McDougall, whom he mentions, but much that has been written from the medical point of view by McCurdy, Jung and Freud. On a later page he is even more severe in his 'reiterated contention that any commingling of the antithetical methods of metaphysics and of science is to be deprecated'.

On this point I see and admit the difficulties, especially from the writer's point of view. But do they not arise mainly as a question of language? Philosophers and rhetoricians have too often been content with verbal triumphs, which we hesitate to destroy on account of the beauty that is to be found in them. But have the scientific men always been exclusively scientific? Have they not sometimes stretched out a thin argument with an eloquent passage? May I not instance cases where groups of important bodies have been slurred over with a phrase which implies a want of critical examination? Do we not remark the frequent personification [1] of 'ductless glands', of 'spinal ganglia' and of 'sub-cortical centres'? Nay! have not even the sublime cortical hemispheres themselves been brought into a discussion, as if they were the great gods of Assyria and the special property of a scientific Sennacherib, before whom the gods of Hamath and of Arpad, of Sepharvaim, Hena and Ivah have had to bow?

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[1] *Instinct and Experience*, pp. 3, 4, etc.

The third point is one which is very difficult to establish, because I am so much in agreement with Professor Lloyd Morgan as to the part played by intelligence in instinct in ourselves and also in the part formerly played by intelligence in the development of instinct in animals. Unless we allow for the power of intelligence in selecting its own environment for its best vital instruments, there must be a difficulty in explaining the perfection of evolution in making the instrument—whether a nerve or a limb—fit so exactly a special feature of the environment—whether a food or a danger. We need the intelligence, the instrument, and exactly the right external conditions of survival for a full explanation. All three are being developed together in different ways, but out of the three, the first alone, to my mind, has the power and the privilege of to a certain extent developing itself by the selection of habitat and external conditions. The other two factors are comparatively passive.

This conclusion follows, if we accept, as I do, the existence of an intelligent instinctive faculty in the thalamus, appearing at an early date in vertebrates and sooner still in other unknown organs in non-vertebrates. Whereas I understand that Professor Lloyd Morgan looks for intelligence, chiefly if not only, in the cortex, in man at any rate. If we limit ourselves to his view, the function of cortical controlling intelligence cannot begin, except at a comparatively late date and will then operate solely by trial and error and with little direct or sympathetic guidance. Instinct, on the other hand, would begin sooner and would later supplement the cortical controlling intelligence with its inborn disposition and prepared instruments and by no other method. Experience, acting by the critical control of the cortex alone, would be slow in modifying the crude reactions of Nature.

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[1] This trap of *personification* is one into which we nearly all fall, myself among others. I remember being much amused at Oxford over a phrase of Dr. Rolleston about skulls:—how in Derbyshire somewhere the dolichocephalic skulls 'enjoyed in their interments a numerical superiority'. It always seemed to me the most postponed form of enjoyment in which a human being could indulge.

In the interpretation which Lloyd Morgan seeks to develop, the function of the cerebral cortex is to 'play down upon and control the functional activities of the lower nerve-centres and thus to modify the behaviour of the organism as a whole'. Again later: 'As soon therefore as the cortex is called into functional activity it begins to influence the sub-cortical centres and to modify the physiological processes which are going on therein.' [1] Cortical control of the above nature over instinct might certainly throw light on the life-history of the young moorhen and over the behaviour of individual animals, but it would not help us to explain how intelligence could have helped in the past to determine the development of any instinctive activity in the moorhen and its ancestors.

But I go further and question whether in any mammal with a cortex [2] there is any evidence of the existence of any means of direct and immediate control by the cortex over any instinctive processes. There is considerable contrary evidence in the life of animals of instinctive independence of the cortex. In fact, it is sometimes puzzling to account for the scanty use of the cortex by the higher animals.

Am I not entitled here to ask whether such a point of view does not come suspiciously near to a metaphysical attribution of fabulous powers to the cortex? In the cerebral organs of man, which we have examined in the last few chapters, the bulk of the machinery gives evidence of strong predominance of upward over downward influences. Where are the cortico-thalamic fibres which control the instinctive activities or the material of perception? Are they not exceedingly capricious in their favours? I understand that some pass to the internal geniculate body, which may possibly touch up the mistakes in hearing and balance; but why are there none passing to the external geniculate body to correct space-perception or chromatic vision? On the whole the presumption is that the bulk of the returning cortico-thalamic fibres passing through the latticed layer to the central assemblage in the ventral nucleus of the thalamus are concerned with general sensations and possibly reasoned control, from which instinctive activities tend to be almost as free as reflex reactions.

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[1] *Instinct and Experience*, pp. 33, 165.

[2] There is much more to be learnt in men about cortical control of motor activities alone. We can say no more at present than that our executive energies are broadly divided into two systems: the reflex system where cortical interference seems to be shut out and inhibited as far as possible where action is concerned; and the so-called voluntary motor system, whose originating impulses are located in certain definite convolutions of the cortex, usually called motor areas.

In the prevailing uncertainty this is not a point which I wish to press. Only a few years ago, when the words which I have quoted above were written by Professor Lloyd Morgan, there was practically no information available as to what connections existed between the cortex and the general group of organs only too generally dismissed under the brief description of the basal ganglia of the brain. We have passed since 1912 into a new world, where there are windows into our cerebral recesses. The windows are still darkened and the sound of the grinding is low, but we need not speak any more in a hushed voice about the cortical autocrat, nor can we treat those tormented little regions of the medial and ventral nuclei of the thalamus nor the lobby of the latticed layer with disregard nor disrespect. The pulvinar is no cushion, where fancy can rest idly, nor the thalamus a chamber of seclusion as the Greeks were wont to call it. We have every reason to suppose that they guard a region of unceasing originating activity as well as a scene of occasional emotional strife.

As I am well aware that it is just as difficult for me as for anyone else to write accurately of a situation which may be fundamentally changed by a few years of research, I am not sure that metaphysical or figurative language is always out of place in dealing with mental and psychical events or describing the functions of the brain.

May I be permitted here to make a brief digression? For a particular reason there is a great temptation to adopt the theory of an intelligent faculty in the thalamic region, an instinctive capacity developed through a long line of descent. An instinctive intelligence, if known to arise very early in phylogenetic history, would explain a certain conscious selection in heredity, such as man has himself applied to domestic animals. Equipped with instinctive intelligence, certain creatures, like ants, would have and did have the advantage of intelligent selection among their own members in a way that man does not permit himself to do. Their physical self-adaptation as a race and the differentiation of sections of it for specific purposes would become, in fact did become, easy in comparatively short periods.

Above and beyond this, or rather further back in phylogenetic history, instinctive intention by choice of suitable domicile would help more rapid modification of organs in vertebrates than would come about by mere natural selection or the destruction of the unfit. Such a view, while it offers a temptation to acquiesce in it easily, as I said above, also presents solid arguments in its own favour. When these are reinforced by inferences from existing structure in man, as without doubt they are, they increase our warrant in believing that there existed a guiding intelligence in half-bred vertebrates before the appearance of any cortex. In this respect, and almost in this respect alone, do I consider that the study of instinct in animals is more helpful than misleading in interpreting human mental problems.

Not only do I feel strongly that the right track to the interpretation of human instinct does not lie through the study of animal behaviour, but I can see clearly the obstacle that arises to vitiate all analogies between the two kinds of instinct in spite of their resemblances. The key to the comprehension of animal instinct is to recognize the triangular tie between intelligence, instrument and environment. Just as the instinctive intelligence places the given instrument or a combination of them in a suitable perpetual recurrence of invariably repeated circumstances, so it watches the adaptation of the former to the latter and gets ultimately caught in its own mechanism. It forgets, if ever it was aware of it, the law of necessity which can degrade some faculties, as it can uplift others. The once adaptive intelligence is itself rigorously adapted by the group of instruments and by the group of circumstances. It becomes, as in the superb organization of insects, a form of intelligence which has lost all the most interesting characteristics of intelligence, plasticity and self-adaptability.

From this triangular tie only man has substantially escaped. And, if even he has only partially escaped, it is not the relics of his chains that deserve interest and study, so much as the fact and method of his escape. The sole credit of finding the upward path lies with the initiative, energy and plasticity of his *human* instinctive intelligence, which led him to keep all his vital instruments plastic. Acting against the animal quality in his instinct, he roved continually away from his best environment and placed himself repeatedly in circumstances which demanded all-round skill. He alone of all animals can take his frail body into extreme cold and extreme heat and subject it to all fancy microbes until he can subdue them.

Thus in spite of his own feeble physical equipment, man's alert intelligence, instinctive intelligence in my opinion, especially in its early stages, did not depend only on his strong points, but was ready to use all his weak ones. He did not remain like the gorilla among tropical vegetation, where long arms, hand-like feet and foot-like hands would inevitably grow clumsier and stronger. He helped his own selection by relying on neat hands and encouraging flat feet. He grew taller and more upright by coming out among long grass and low shrubs, where he had to hold his head high or perish. And during this dreadful period of weary repetitions of failure, where no thanks could go to those individuals who made the wrong experiments, some queer things happened to his body, which may or may not have been within his unconscious intention. He probably improved the thumbs on his hands and dropped the thumbs on his feet. His head developed binocular vision, while it mostly dropped the biaural concentration of his ears.[1] So ultimately his eyes became the most sensitive instrument of his intelligence and perhaps drew some special part of his intellectual organs upwards. The curious fact appears that, while developing extreme specialization in some directions, he relied on absolute plasticity in the most important features of his organization.

No doubt man's greatest achievement in plasticity was the differentiation of a cortex out of his primitive form of mind. Far be it from me to say that he did it because he meant to do so. He may have meant to do so and his meaning and intention may have helped him. I see no reason why I should not believe that to be the case. It may be a link without being a necessary link. All we know is that he did develop a human cortex.

Now the new fact appears, new for us in the last twenty-five years, that he developed a second form of intelligence without discarding the old. He has kept in the thalamic region, and especially in the medial nucleus of the optic thalamus, the organ of his earlier primitive intelligence, and I regard it as extremely improbable that he neglected to lift all the instruments of his instinctive faculty to a level higher than any possessed by all or any of the creatures who went before him. To look no further, we have the whole history of the development of the thalamic region to prove it. All this man has done without it being necessary to credit him with an intention to create this stupendous fabric. But there is no scientific crime in allowing ourselves to consider the inchoate but expanding intention as not wholly impossible.

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[1] Vestigial traces of this capacity still remain with some people. I have it myself to a rather unusual degree, being able to twitch my ears separately, as well as together.

For that reason it is a mistake in my opinion to begin to consider the question of human instinct from any other point of view than by remembering that the first of all the activities of the higher instinctive faculty, both in time and in logical order, was and is to use the intelligence of the cortex. That use implies a judgment and it implies also the power of disuse and the potential judgment that the use of the cortex is a mistake. We probably cannot altogether refuse to feel, but it is possible to refuse to think. In fact it is surprising how often it is done.

Although I thoroughly agree with Professor Lloyd Morgan that the modification of instinct by intelligence is a great factor in instinctive development, I think that a cortex in process of differentiation could not be a sufficient instrument for the purpose. The cortex seems to me to have arrived too late on the field of action. There is to my mind ample evidence that the instinctive faculty is and always has been a form of intelligence. What I am more concerned about now is the view that the human instinctive faculty is a present active form of intelligence carrying out an immense variety of functions, some of which are wholly and some partly effected in extra-consciousness. It is not therefore necessary for me to concede, so far as he does, the theory of cortical control over sub-cortical regions.

For similar reasons I turn with confidence to examine the contrary contention that the guiding form of intelligence, which has made our human evolution a 'creative evolution', subject to an 'entelechy', as Dr. Driesch would phrase it, is to be found in the faculty of intuition. According to my present views intuition is dependent on the cortex; it is the faculty which uses the cortex alternately and conjointly with reason. It occasionally uses the same cerebral convolutions with greater efficiency than the conscious reason, because it seems to command a wider range of memory and at the same time it is freer from instinctive interference and from affective tendencies. But it lacks initiative.

Consequently I fail to see either sufficient energy or sufficient general adaptability in the intuitive faculty to carry out the enormous vital duties of a prehistoric providence, with which Professor Bergson would credit it. For one thing I recognize the fatal want of control over the central mechanism of the so-called voluntary motor system which besets the intuitive faculty. There are not many important movements which we carry out in extra-consciousness. An extra-conscious power is to that extent limited. Nor is it probably stronger than nor as strong as the instinctive faculty, whose work is equally evident in many of our extra-conscious mental operations.

It is to my mind so necessary to speculate about mental facts in our present prevailing ignorance and expanding knowledge that I do not consider it at all derogatory to an argument to say that I consider Professor Bergson's faculty of intuition to be to all intents and purposes a metaphysical power. He has, however, made it very difficult for us to accept his views or to discuss them. He has left intuition undefined on all its edges, he has allowed it to overlap with the very definite sister dogma of instinct, and finally, in the language of his open letter to Dr. Höffding,[1] he has questioned the right of his critics to treat his views by the comparative method and perhaps even to place one passage of his alongside another, if we fancy that we see an inconsistency.

As I cannot altogether reconcile his doctrine on intuition with my own and do not wish to run the risk of misrepresenting his, I will venture to quote only a single passage in which he refers to instinct with that peculiar quality of insight which crowns his courageous effort to lift man on to a level where he may be considered to be more of the arbiter and director of his own development than many more strictly scientific thinkers would allow. My sympathies are very much with Bergson's views, when he writes as follows: 'Si la conscience qui sommeille dans l'instinct se réveillait, s'il s'intériorisait en connaissance au lieu de s'extérioriser en action, si nous savions l'interroger et s'il pouvait répondre, il nous livrerait les secrets de la vie.' [2]

Although I understand Bergson to concede duality in memory, I am not clear that he would allow mental duality to be the definite reality which I firmly hold it to be. While he does not place all intelligence in the cortex, as Lloyd Morgan effectually does, Bergson seems to hold that the intelligent rival to reason should be conceded as superior to reason, as above it in the spiritual sense in a way that seems to me unjustifiable. In fact, I do not accept spiritualization, if I may use the term, to be a process standing on one side of us or above us, so to speak, so that only our own minds and reason can be lifted up and spiritualized. I should understand the process of spiritual improvement to be applicable to any of our faculties by moral discipline and refinement, by consistent and serious purpose, by realizing aims that become higher only because we understand them better. If we were to define Bergson's *élan vital* by saying that it was the spiritualization of instinct, it would not be a bad description and it would almost come within my use of the word.

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[1] Reprinted in the French Edition of Höffding's *Modern Philosophers*.

[2] *Évolution Créatrice*, p. 179.

It appears to me, therefore, that my most important conclusion as to mental duality is not confuted either by the prevailing view that all our intelligence must be referred to the cortex, nor by attributing to intuition a superior power emancipated from all traceable connection with the body, a power which arrogates to itself from both sides some, if not all, of the mysterious energy and inspiration drawn from all those extra-conscious activities and capacities which certainly can be definitely referred either to the instinctive or to the intuitive faculties.

One more strand of my conclusions must be unravelled before I can venture to draw a few inferences or to expand those which I have already made elsewhere. We are bound to conclude from the nature of our argument on structure that the form of intelligence, whose seat lies undoubtedly in the thalamic region, is much more concerned with feeling than is the other form of intelligence, which receives in the higher region of the cortex all its sensory material already half prepared to pass into that stage of mental treatment usually called thought and reflection. Instinct is necessarily involved chiefly with feelings, before they have become thoughts. The reason or intellect, together with the intuitive faculty, has little indulgence for feelings in their red-hot stage. Emotions are largely broken down into thoughts before their elements pass up to the cortex. Yet we have no right to conclude summarily that instinct has no power of intelligent thought nor that reason and intuition are altogether immune from feeling. It is at this point in our investigation that we are necessarily driven back to conduct further enquiry by the method of introspection.

In determining whether in the first place instinct is more concerned with feeling than with thought we come on very difficult ground. In an earlier chapter, XII, I have seen reason to maintain that the distinction between thought and feeling is not fundamental. Feelings are mental events, which pass ultimately into the further stage of thought, if they run their full course. They may run that course in more ways than one, as, for instance, by the intermediate stage of an emotional storm, which may pass into various forms of expression or explode into action or subside gently into melancholy and thought. Feelings and thoughts are mental processes or psychical events of essentially the same character, effecting definite disturbances in consciousness, where they come under the influence of impulses generated by outside events and comparisons. Their external relations and not their essential character, determine their form either as feelings or thoughts.[1]

Any compound complex of sensations generally enters actuality in consciousness by being a feeling. Three main facts characterize feelings. They are peculiarly near to a generalization called the 'self'; they generally have some relation to space; they always have some relation to time. We may perhaps say that the first of these appears to be the most prominent, but the last is the most essential characteristic. As these three characteristics weaken, feelings tend to become thoughts. Should any combination of allied conditions tend to renew the personal, space or time relations in connection with a group of thoughts, those thoughts tend to relapse into feelings. Thoughts may easily recombine to form a complex feeling.

Regarding the alliance between instinct and feeling in the popular mind, the terms are too often used almost synonymously, as, for instance, by so careful a stylist as A. V. Dicey, where he writes of an 'appeal to feeling or instinct'.[2] Strictly speaking, the identity of the two is untenable and perhaps meaningless, whereas another common expression, 'an instinctive feeling', so far from being a tautology, really signifies a valid distinction in quality between primitive and almost protopathic feeling as contrasted with intellectual feeling, which is apt to be refined, epicritic and even nugatory in character on its way to becoming a thought.

The relation of instinct and feeling is very real and close, but it is a relation of contiguity and time association rather than identity. Sensations stream in very close to vital sources of life and are identified instantaneously with our time estimates. Most of them pass away with a swiftness that prevents them surviving long enough to pass into the class of thought.

Still, in my belief, the instinctive faculty of intelligence holds on very grimly to vital principles closely associated with recurrent feeling but strictly speaking independent of them. The sensations slip by in myriads, their temporary combinations as feelings pass by in their hundreds, yet the instinctive principles remain and sometimes lift themselves up into the region of thought and thought of very great power. They would be what Leibniz called 'the small dark motions of the soul'.

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[1] It will be noticed that in the text I am neglecting for a moment the existence of images, as mentioned in Chapter XII. Images more closely resemble feelings than thoughts, except that they have a power of existing outside of time through the special roads of memory and dreams. They are also very much detached from the self and have a transitory existence subject to uncontrolled recurrence.

[2] *Law and Opinion*, p. 446.

Concurrently we have as passengers through the sphere of thought and reflection groups of refined feelings entertained by both the reasoning and the intuitive faculties, but possibly very few by the latter. The work of reason, supreme on its throne in consciousness, is to analyse sensation, to refine emotion, to sublimate passion and to enshrine the essence of all thought in some system conceived *sub specie quâdam æternitatis*.

If this introspective analysis be true, we should have in the thalamic region a seat where feelings are plentiful and strong, while thoughts are few, indistinct and hesitating rather than weak. In leaving the instinctive centre thought would be still confused with feeling, blundering and imperious, demanding vigorous courses and policies from the will and the motor system. In the cortical centre thought and reflection would have to deal with numerous feelings but none of them too insistent. Higher mental operations would be cautious but not indefinite, probably less inclined to waver than instinctive combinations would tend to be. Reasonable and hesitating characters are not necessarily those which are guided by the cortical centre, but often reside in men where the thalamic and cortical centres are of equal and stable influence. Similarly emotional storms are most frequent with characters that are often supposed to be unbalanced, whereas inner conflicts of every variety of affective nature more often arise where the duality of temperament shows itself to be evenly divided but unreconciled.

There is a duality of feeling, which accompanies and overlies the duality of thought. The cleavage shows itself unevenly in most people. The instinctive centre is guided in action and counsel by a superabundance of feeling. The reasoning centre is slower to bring to bear its cortical powers and probably, if the voluntary motor centres were not situated in the cortical hemispheres, the more highly differentiated system would have but a small chance in influencing the will and determining action. Passion and religion have their stronghold in the instinctive centre. Philosophy and science are created entirely in the other.

On the basis of these main conclusions a great many inferences are possible, but it would be a mistake to carry any of them far, until the central doctrine of mental duality has been thrashed out. There is a fair case for mental duality from the side of introspection. There is a strong case for dual mental centres based on the arguments from structure. There is an overwhelming case for dual sensibility based both on physiology and on comparative anatomy. Nor is there much difficulty in tracing an almost exact parallelism between all these separate arguments implying that one may be legitimately used to strengthen the case of the other and to construct a powerful self-supporting and self-reinforcing body of evidence to maintain the hypothesis of dual human mentality.

In the system as it stands there is one side that is more open to ultimate attack than the other. On the physical side the arguments are well knit together and the inferences mutually strengthen one another, yet the actual facts adduced as a basis of induction are comparatively small in range. There remains far, far more to be learnt about the reciprocal relations of the cortical hemispheres with their basal ganglia, as they are often called, than in any links and influences of which we yet can claim to have discovered the key. The hypothesis of dual intelligent centres with dual sensibility is far from having exhausted the facts.

On these grounds we must leave the main argument on the mutual relations and influences of the thalamic and cortical regions to be verified in detail, if that is feasible, by the slow conquests of many generations. By the method of introspection alone the various sections of the human brain will never give up their secrets. The separate centres are too cleverly co-ordinated together and too speedily efficient in supplementing each other's deficiencies and disabilities to make it impossible for many people to continue to maintain by *a priori* argument that the anciently conceived and commonly held doctrine of a literal unity of mind is a permanent and valid interpretation of mental phenomena.

Inferences which are permissible and legitimate on foundations admittedly provisional should not, to my mind, go further than suggested solutions of problems already urging some kind of social difficulty crying out for an explanation. It was precisely from this point of view that I originally approached the question of instinct, which once seemed to me, before I had gone very far in studying it, the root and source of that very mysterious mental fact, 'Economic Value'. My present examination has strongly confirmed this view and, if from the philosophical and scientific standpoint the indentity of instinct may be considered still very much of an open problem, I claim that from the economic standpoint my present theory of Instinctive Value offers a sound and broad explanation of the fundamental social phenomenon of our civilization.

In my former investigation of the Psychological Theory of Value I committed myself also to a doctrine very difficult to maintain, to which Professor McDougall has given much vogue, that powerful social forces gain their strength, not by an inorganic combination of individual wills but by an organic fusion of feelings and interests among masses of people. This theory involves a belief, it would be impossible to call it more at present, that among people in a common state of tension feelings are communicable otherwise than by signs or words and that, with feelings, simple thoughts slip in and out of minds and become rapidly transmissible between individuals in a way similar to that of feeling.

It would be out of place at the end of the present work to embark on a lengthy discussion of an outside social doctrine, but there is a defensible reason for my giving a rough draft of my views on the subject. It is worth emphasizing, because it is substantially connected with instinct under a peculiar form, 'group instinct'. Group instinct is not an instinct to act together in groups, but a tendency of unit instincts of the same kind to share their feelings in common, to develop a suitable emotion in common and generally to express themselves by common speech and action.

The well-known term, 'herd instinct', does not quite express an idea of this kind. So far as the herd instinct is a separate instinct, which is perhaps doubtful, it is composed of separate minor unit instincts for companionship, mating, imitativeness, defence and so forth, which naturally lead to gregarious habits in many animals and particularly in man. Herd instinct would therefore only be a kind of group instinct of those animals or people who are subject to the instinct of companionship and share it together. Other different kinds of natural unit instincts and emotions may be shared together, such as fear, anger, turbulence, placidity and so on. Most ordinary instinct units tend to become group instincts in any considerable number of people who are under the same influence of hearing the same voice, reading the same message, meeting in the same place or, more generally, living in the same period. Both time and place, owing to their effect on feeling, operate powerfully in the development of instinctive activity and emotional expression.

This peculiar tendency for the propagation of feeling is prompted by the innate instinctive faculty, both in giving and receiving. As to the method of propagation there is some doubt. Many people would admit the possibility of telepathy and less probably of telegnosis, which is communication of knowledge at a distance. Professor McDougall quite definitely rejects it,[1] as not proven. I am prepared to believe that there is a large amount of evidence in its favour, notably in Professor Gilbert Murray's experiments in thought-reading. Taking, for instance, the case of Becket's murder, which has been already referred to in two earlier chapters, I can see how the transmission of acute feeling from one person to another would in many cases enable a considerable amount of information to be conveyed with it. Telepathy becomes very easily a clumsy form of telegnosis.

It is so strongly instinctive in us to communicate feeling, that its extra-conscious transmission from one person to another in formal and in informal groups I take to be a matter of fact. Even if its direct transference from one individual to another by telepathy is not acceptable to the degree of proof, it is more probable and almost certain of the common feelings of a crowd. It is impossible to be dogmatic about the feelings of individuals whose inner history is unknown, but about gregarious men and women in the mass it is possible to reason with some assurance.

There is already a considerable literature on the subject. It has been treated at some length under various names, as public opinion, the general will, the general conscience, collective consciousness, the group mind and group values. I have written to a considerable extent on the latter variety of it, especially on the regular and skilled appeal to it made by professional sellers under the form of advertising. Under a pathological aspect it has been studied as crowd or mass psychology. It is a considerable branch of political science. Where telepathy is not invoked, the known effects are attributed to two causes: individual suggestion and the contagion of emotion, neither of which appear on reflection to offer anything in the way of explanation. The general phenomenon has been epigrammatically and wisely described as, 'Le mal de l'unanimité, ce grand danger des foules'.[2]

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[1] *Group Mind*, p. 28.

[2] G. Tarde, *L'Opinion et la Foule*, p. 170.

To account for the conspicuous facts there are various shades of view. Some attribute general unanimity of opinion to affective causes, as Pattison: 'Deeper than opinions lies the sentiment which predetermines opinion.' [1] Others, like Dicey, show an uneasy shade of differentiation, admitting the advent of a new factor: 'Benthamite Liberals have looked upon men mainly and too exclusively as separate persons.' [2] A. Fouillée quotes his mystical son-in-law, Guyau, as going much further: 'Notre intelligence lui-même n'étant autre chose que l'espèce humaine et même le monde devenus en nous conscients.' [3]

The closest study has been made by Professor McDougall and Dr. Freud. The former rejects telepathy as a solution and indeed in most crowd and mass situations it is an unnecessary hypothesis. In lieu of it he discusses as a possibility the idea of collective consciousness, which he does not avowedly support, but allows that it cannot be lightly put aside. He quotes Hegel and Haeckel as having played with different forms of it, but maintains with considerable justice that the root objection to a vague idea of this kind is that in it the consciousness of the units is being used twice over, once as the individual consciousness and again as an element entering into the collective consciousness.[4]

The great variety of interpretations argues a fundamental difficulty in dealing with the facts. On the pathological side of the matter I do not lay much stress, as I have written elsewhere [5] in criticizing M. Le Bon's views,[6] for the simple reason that I consider that the basic instincts, on which crowd action is generally founded, are altogether good. They are only subject very easily to misguidance for the reasons given by Dr. Freud, who clearly demonstrates that the joint action of the group is chiefly characterized by two phenomena: the intensification of the emotions and the inhibition of the intellect.[7]

Crowd opinion and crowd action are both manifestations of common instinctive activities. When they express themselves in emotion they pass off, but if the feelings pass into action, no one can predict the result, because we can be sure of only one thing and that is that reason will hardly ever enter into it.

The feeling that runs like wildfire through a crowd, so that a little rustle of wind in the leaves and branches is as effective as the spoken word to convert tension into emotion, and to stir up into action any floating sentimental idea that may be not far from the surface of most minds, will be substantially one and the same which a poet will arouse in a people by a few well-chosen lines or the lilt of a song.

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[1] *Essays*, II, p. 264.

[2] *Law and Opinion*, p. 279.

[3] *Morale des Idées-Forces*, p. 151.

[4] *The Group Mind*, pp. 28–36.

[5] *The Psychological Theory of Value*, pp. 110–13.

[6] *The Crowd.*

[7] *Group Psychology*, p. 33.

The orator and the poet, however, may claim the credit of importing into the ready turmoil of incipient feeling and floating emotion some few new elements, which may be cortical, in the form of ideas and appeals to thoughts which are not too firmly fixed in the minds of the people they are influencing. The crowd emotion will seize upon the small modicum of thought, redissolve it into feeling and combine it with the new insurgent feelings already present. There will be a powerful union of fresh feelings introduced into consciousness by new sensation, and of old thoughts brought back as feelings into time.

It has been called intuitive sympathy. Sympathy it certainly is; but I believe the epithet, intuitive, to be a misnomer. The small intellectual element, contained in the mixed state of feeling, has been dissolved out of recognition. I am sure that there is no new intuitive inspiration, which above all other conditions requires solitude and cortical rest for its development. Its power is certainly drawn from sources that are subconscious, unconscious or extra-conscious, as we may choose to call it. It is almost certainly instinctive. It has very little to do with the reason or the cortex. It lies very near to the centre of all sensation, to what may equally be called the source of joy or the fount of tears.

I am confident, however, that secret vibrations of sensation move chords of sympathy within us, not only in the realms of sentiment nor in the mystic recesses of religious faith and communion, but also frequently and persistently in all kinds of everyday wear and tear. The foundation of all economic life lies in the pedestrian interpretation by each one for himself of Value. Value is the precursor of effort and economic values are created by instinct. I shall come to the cause of philosophic values later.

Now the analysis of value shows that it is first of all an individual mental event, and secondly and derivatively that it becomes also a matter of co-operation and of competition. No man is long content with his separate ideas of value. He passes on to desire that what he chiefly values should also be valued by others. He judges of the opinion of others by their efforts in competition with himself.

Consequently in economic life the values that really count are group values, the values of all those material articles which a large number of people want all together. The high money values are created by the few rich people with fat purses; they are conditioned by the scarcity of supply. The stable values at moderate prices are group values of articles which, although they are often in comparative abundance, are in steady demand by large numbers of people. They are not always for necessaries like food; they also embrace very common luxuries like tobacco, tea, beer, the means of locomotion and that kind of literature that demands little effort.

What maintains the stability of group values is instinct; I may perhaps say, the advanced instincts in a certain consecutive order; the preservation of life, parental affection and the desire for dominance.[1] In pre-contract days when values were not maintained and enforced by the sanction of the law and the conventions of civilization and business, these instinctive desires were pursued by crude struggle, war and cunning. Our system of economic competition and exchange has modified the struggle for life in principle, but in many forms of rivalry it is continued. The chief objects of economic effort are now resolved into one general aim, the maintenance for ourselves and our families of the standard of comfort [2] in which we find ourselves by birth or to which our level of abilities permits us to aspire. These standards of comfort are maintained for us by public opinion in many instinctive ways in the form of group values.

The difference between the old and the new ideas of struggle is marked by the aggregation of groups, whose bonds are partly those of common interest but more subtly bonds of real instinctive sympathy, which often countervail bare economic interest. In citing the over-tried phrase of chords of sympathy a few paragraphs earlier, I was not adding one more burden on a sentimental metaphor that is as old as Issachar, but I referred to a possibility that is likely some day to be proved a certainty. We shall recognize as a commonplace fact, that unknown waves and vibrations are passing between individuals all the time. The method of physically tuning vibrations and waves, so as to be serviceable in personal communications, will no doubt be becoming as much a branch of psychology as now it is to study the internal mechanism of the eye or the ear.

It may well be asked at this point, whether the intuitive faculty, which is so large an element of mental duality, is not also called in to assist and determine our efficiency in economic life? As the intuitive faculty operates altogether in extra-consciousness, it is always very hard to say that it does not take part in any mental operation. In all probability, however, intuition takes no share in economic struggles, chiefly because its rôle is very much restricted by the predominant part played by reason in everyday conscious occupations. The extra-conscious work of the cortical centres is probably subordinate to the tasks set for it by reason in purely intellectual work, which is sometimes also used for economic ends. The intuitive faculty is interested only on the intellectual side. An engineer or a mathematician or a scientific teacher or even a poet may sell his intellectual-intuitive work for bread and butter. He will consequently ask from his conscious and unconscious brains accurate work and/or effective expression, whose ultimate utility will be economic for him but not necessarily so for the world.

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[1] *The Psychological Theory of Value*, pp. 94–102.

[2] *Ibid.*, p. 168.

It is very seldom that we can see outward evidence of intuitive work, produced as an end in itself, except in minds of a high order and great specialization, like those of Henri Poincaré or Srinivasa Ramanudjan.[1] Inwardly in ourselves we are aware subconsciously of intuitive effort, directed towards ends that run athwart and possibly run counter to gainful methods of endeavour. It is here that we each and all of us give credit by introspection to some sublime form of effort and aspiration combined, which is not feeling and yet does not take a hostile attitude to feeling, which does not claim to be essentially religious and yet is helpful to religious progress, which finally aims at some other kind of value than economic value.

Modern philosophers are sometimes content to call the aim of intuition, 'value' pure and simple; but it seems to me not to be helpful to appropriate for a remote speciality a word already overloaded with meaning in many ordinary walks of life. It is, strictly speaking, philosophic value that is in question, but the accurate definition of philosophic value will depend on our successfully shutting off from the higher meaning of value all its economic meanings, which is no easy task.

Spinoza tried to define the object of intuition, as the intellectual love of God. The expression is not freely used and is hardly accepted, because to many of us it seems to imply, mistakenly in my opinion, a contradiction in terms. Whatever it may be that the intuitive faculty is groping for, when left to itself, it would include a permanent reconciliation with the instinctive faculty at the highest possible level, not merely an everyday meeting-ground in the daily acts of will from which our behaviour, our conduct and our policy emerge. Every act of will is an act of compromise on some level, which is generally lower than our highest intention. It is the meeting-point of two forces, over which reason can have no more than the partial control allowed to it by the small number of mental facts that are apparent in consciousness. It seems to me abundantly clear that we must allow that the number of mental events present to our awareness are few as compared with an unknown quantity of subsidiary determinants, which lie somewhere in memory, somewhere in past history, somewhere no doubt in actual present existence in our extra-conscious life.

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[1] See Note to Chapter V.

Perhaps I may venture to hope that nothing in the above body of systematic reasoning may be held permanently to conflict with my own private views. It is important not to mingle what seems to be reasonably established with what can be only a matter of surmise. In Chapter VII, on advanced intuition, I have indicated my view that the faculty of intuition carries the powers of the mind up to the very limit of our known capacities and presumably a little further, until it brings us within touch of capacities which to us are still unknown.

A critic is free to call any doctrine of this nature metaphysical. I am not prepared to deny it. I would merely say that, if the word metaphysical has to be accepted, it will tend to show that our ignorance of ourselves, of our minds, of our intellectual capacity, of our instinctive faculty and of our intuitive faculty is not absolute but relative. We do know a great deal about ourselves and what we know carries us up on more than one edge of our capacities to that which is for the moment unknown, but part of which the human race of the future may yet hope to know. All those frayed edges of knowledge can be legitimately called metaphysical.

The borderland of mental events lies in extra-consciousness, a sphere whence fragments drift over into our consciousness. On the side of our instinctive faculty the extra-conscious operations of our minds bring us into various degrees of co-operation with other minds like our own. The chief vehicle of communication seems to be of the nature of feeling; but it would be a mistake to say that thought and knowledge are excluded from a similar privilege.

The parallel capacity in our intuitive faculty brings us extra-consciously into intimate relations with minds or a mind quite probably very different from our own. It is possible that the vague indications of intuition contain intimations of a kind of knowledge which we do not recognize as knowledge, or of something which has the same superior quality of permanence as compared with our thought, as that which we conceive our thought to have in relation to what we describe as feeling.

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